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AEROSPACE MEDICINE AND BIOLOGY

A CONTINUING BIBLIOGRAPHY

WITH INDEXES

(Supplement 152)

MARCH 1976

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

ACCESSION NUMBER RANGES

Accession numbers cited in this Supplement fall within the following ranges:

STAR (N-10000 Series)	N76-11993–N76-14017
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NASA SP-7011 (152)

AEROSPACE MEDICINE AND BIOLOGY

A CONTINUING BIBLIOGRAPHY WITH INDEXES

(Supplement 152)

A selection of annotated references to unclassified reports and journal articles that were introduced into the NASA scientific and technical information system and announced in February 1976 in

- *Scientific and Technical Aerospace Reports (STAR)*
- *International Aerospace Abstracts (IAA)*

Scientific and Technical Information Office
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MARCH 1976
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INTRODUCTION

This Supplement to *Aerospace Medicine and Biology* (NASA SP-7011) lists 252 reports, articles and other documents announced during February 1976 in *Scientific and Technical Aerospace Reports (STAR)* or in *International Aerospace Abstracts (IAA)*. The first issue of the bibliography was published in July 1964; since that time, monthly supplements have been issued.

In its subject coverage, *Aerospace Medicine and Biology* concentrates on the biological, physiological, psychological, and environmental effects to which man is subjected during and following simulated or actual flight in the earth's atmosphere or in interplanetary space. References describing similar effects of biological organisms of lower order are also included. Such related topics as sanitary problems, pharmacology, toxicology, safety and survival, life support systems, exobiology, and personnel factors receive appropriate attention. In general, emphasis is placed on applied research, but references to fundamental studies and theoretical principles related to experimental development also qualify for inclusion.

Each entry in the bibliography consists of a bibliographic citation accompanied in most cases by an abstract. The listing of the entries is arranged in two major sections: *IAA Entries* and *STAR Entries*, in that order. The citations, and abstracts when available, are reproduced exactly as they appeared originally in *IAA* or *STAR*, including the original accession numbers from the respective announcement journals. This procedure, which saves time and money, accounts for the slight variation in citation appearances.

Two indexes—subject and personal author—are included.

An annual index will be prepared at the end of the calendar year covering all documents listed in the 1976 Supplements.

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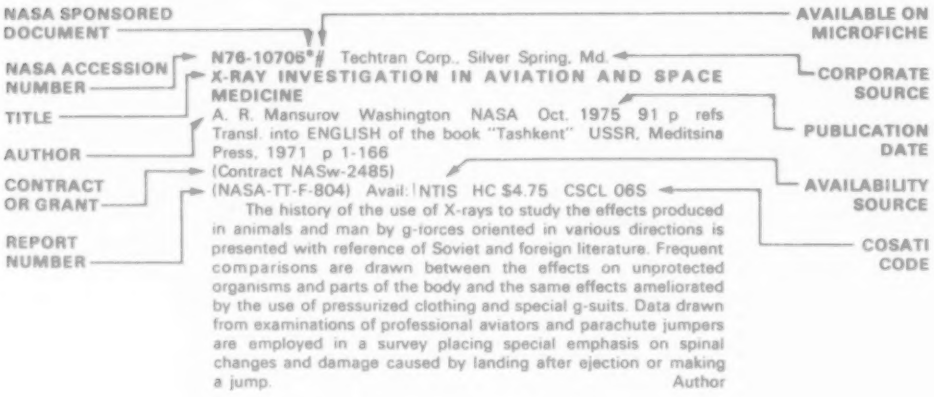
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TITLE
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PUBLICATION DATE
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The history of the use of X-rays to study the effects produced in animals and man by g-forces oriented in various directions is presented with reference of Soviet and foreign literature. Frequent comparisons are drawn between the effects on unprotected organisms and parts of the body and the same effects ameliorated by the use of pressurized clothing and special g-suits. Data drawn from examinations of professional aviators and parachute jumpers are employed in a survey placing special emphasis on spinal changes and damage caused by landing after ejection or making a jump. Author

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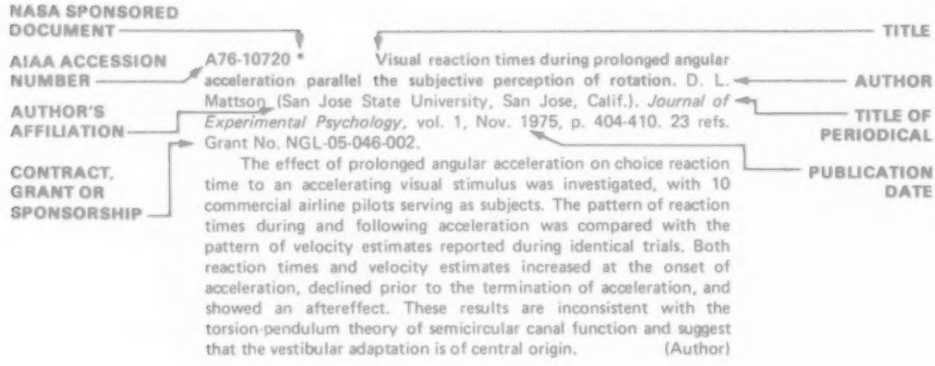
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TITLE
AIAA ACCESSION NUMBER
A76-10720 * Visual reaction times during prolonged angular acceleration parallel the subjective perception of rotation. D. L.
AUTHOR
AUTHOR'S AFFILIATION
Mattson (San Jose State University, San Jose, Calif.). Journal of
TITLE OF PERIODICAL
Experimental Psychology, vol. 1, Nov. 1975, p. 404-410. 23 refs.
CONTRACT, GRANT OR SPONSORSHIP
Grant No. NGL-05-046-002.
PUBLICATION DATE
The effect of prolonged angular acceleration on choice reaction time to an accelerating visual stimulus was investigated, with 10 commercial airline pilots serving as subjects. The pattern of reaction times during and following acceleration was compared with the pattern of velocity estimates reported during identical trials. Both reaction times and velocity estimates increased at the onset of acceleration, declined prior to the termination of acceleration, and showed an aftereffect. These results are inconsistent with the torsion-pendulum theory of semicircular canal function and suggest that the vestibular adaptation is of central origin. (Author)

AEROSPACE MEDICINE AND BIOLOGY

A Continuing Bibliography (Suppl. 152)

MARCH 1976

IAA ENTRIES

A76-12822 * # **Shuttle bioresearch laboratory breadboard simulations.** S. T. Taketa (NASA, Ames Research Center, Moffett Field, Calif.). *AAS, AIAA, IEEE, ORSA, and IMS, Meeting on Space Shuttle Missions of the 80's, Denver, Colo., Aug. 26-28, 1975, AAS Paper 75-257.* 23 p. 6 refs. Research supported by the General Dynamics Corp.

Laboratory breadboard simulations (Tests I and II) were conducted to test concepts and assess problems associated with bioresearch support equipment, facilities, and operational integration for conducting manned earth orbital Shuttle missions. This paper describes Test I and discusses the major observations made in Test II. The tests emphasized candidate experiment protocols and requirements: Test I for biological research and Test II for crew members (simulated), subhuman primates, and radioisotope tracer studies on lower organisms. The procedures and approaches developed for these simulation activities could form the basis for Spacelab simulations and developing preflight integration, testing, and logistics of flight payloads. (Author)

A76-12823 * # **Life sciences manned payloads for Shuttle/Spacelab.** D. B. Heppner, G. L. Drake (General Dynamics Corp., Convair Div., San Diego, Calif.), and C. B. May (NASA, Marshall Space Flight Center, Huntsville, Ala.). *AAS, AIAA, IEEE, ORSA, and IMS, Meeting on Space Shuttle Missions of the 80's, Denver, Colo., Aug. 26-28, 1975, AAS Paper 75-256.* 21 p. Contracts No. NAS8-26468; No. NAS8-29150; No. NAS8-30288; No. NAS8-31368; No. NAS8-29462.

This paper summarizes the highlights of the NASA/MSFC Life Sciences Payload Definition and Integration studies. Four closely related studies describing research requirements, engineering analysis, and design concepts for a family of life sciences laboratories are reviewed. The study approach was based upon a broad laboratory capability to do research in medicine, biology, life support and protective systems, and man-systems integration. This laboratory design concept provides the flexibility desired for the changing requirements of a long-term space program. Designs of the resulting conceptual laboratories that satisfy the research goals are presented. The on-going NASA program activity to support future life sciences involvement in the Spacelab is outlined. (Author)

A76-12873 # **Application of Space Shuttle to fundamental and applied microbiological research.** J. V. Mayeux. *AAS, AIAA, IEEE, ORSA, and IMS, Meeting on Space Shuttle Missions of the 80's, Denver, Colo., Aug. 26-28, 1975, AAS Paper 75-255.* 24 p.

Unique possibilities provided by the Space Shuttle to the biologist are related to a near-zero gravity force environment and synergistic effects with respect to radiation, geophysical periodicity, and magnetic fields. The characteristics of cellular mass and energy transport are considered and studies of multiphasic microbial growth systems are discussed. Attention is also given to the selection of mutant microbial-clones in zero-G and research applications in convection-free liquid. G.R.

A76-12957 **Effects of decreasing arterial blood pressure on cerebral blood flow in the baboon - Influence of the sympathetic nervous system.** W. Fitch, E. T. MacKenzie, and A. M. Harper (Glasgow, University, Glasgow, Scotland). *Circulation Research*, vol. 37, Nov. 1975, p. 550-557. 51 refs. Research supported by the Medical Research Council.

A76-12958 **Influence of potassium ions and osmolality on the resting membrane potential of rabbit ventricular papillary muscle with estimation of the activity and the activity coefficient of internal potassium.** T. Akiyama and H. A. Fozzard (Chicago, University, Chicago, Ill.). *Circulation Research*, vol. 37, Nov. 1975, p. 621-629. 15 refs. Grants No. PHS-HL-11665; No. PHS-HL-05673.

A76-12959 **Interaction of the chemoreflex and the pulmonary inflation reflex in the regulation of coronary circulation in conscious dogs.** S. F. Vatner and R. J. McRitchie (Harvard University; Peter Bent Brigham Hospital; Children's Hospital Medical Center, Boston; New England Regional Primate Research Center, Southborough, Mass.). *Circulation Research*, vol. 37, Nov. 1975, p. 664-673. 30 refs. Research supported by the Council for Tobacco Research and American Medical Association; Grants No. PHS-HL-15416; No. PHS-HL-17459; No. PHS-HL-10436-009.

A76-13148 **A man and a collective as elements of a control system.** M. A. Aizerman. *(Avtomatika i Telemekhanika*, May 1975, p. 83-96.) *Automation and Remote Control*, vol. 36, no. 5, Oct. 10, 1975, pt. 1, p. 776-785. 18 refs. Translation.

The differences between mathematical models of software or hardware systems and of models of systems made of people and their collectives are described. The related problems include multicriterion nature of a personality and a collective; conscious behavior of elements in the system; the dynamic nature of processes in the systems and the part played by game balances in their description. It is proved that a new speciality studying the properties of people and collectives as elements of control systems should emerge. (Author)

A76-13347 **Scotopic and photopic dark adaptation of the b wave in isolated rat retina.** W. Ernst and C. M. Kemp (Institute of Ophthalmology, London, England). *Nature*, vol. 258, Nov. 13, 1975, p. 170, 171. 15 refs. Research supported by the Medical Research Council.

A76-13368 **The bioengineer on the medical team - His role, responsibilities, and career (Le bio-ingénieur dans l'équipe médicale - Rôle, responsabilités, carrière).** D. Laurent (Hôpital Henri-Mondor, Créteil, Val-de-Marne, France). *(Société des Electriciens, des Electroniciens et des Radioélectriciens, Demi-Journée d'Etude sur les Techniques Biomédicales, Malakoff, Hauts-de-Seine, France, Apr. 18, 1974.) L'Onde Electrique*, vol. 55, Jan. 1975, p. 48-52. In French.

The paper investigates some of the implications of the presence of an engineer on the medical team at the hospital. The benefits due to the bioengineer's work in the research aspects of the medical mission are outlined. The responsibilities of the bioengineer are characterized in their technical, conceptual, and education aspects. Some problems encountered by the bioengineer while working on

the medical team due to present French regulations are discussed.
P.T.H.

A76-13399 * **Orientational anisotropy in infant vision.** S. Cohen Leehey, A. Moskowitz-Cook, S. Brill, and R. Held (MIT, Cambridge, Mass.). *Science*, vol. 190, Nov. 28, 1975, p. 900-902. 24 refs. Research supported by the Spencer Foundation; Grants No. NIH-R01-EY-01191; No. NGL-22-009-308.

Infants prefer to look at horizontal and vertical gratings rather than at oblique gratings only when they are at or near threshold spatial frequencies, as would be expected if acuity for oblique edges is lower than that for horizontal and vertical edges. That such a bias exists as early as 6 weeks of age suggests that the orientational asymmetry of the visual system depends on endogeneous maturation rather than exposure to a carpentered world. (Author)

A76-13400 * **Perceived visual motion as effective stimulus to pursuit eye movement system.** S. Yasui (California Institute of Technology, Pasadena, Calif.) and L. R. Young (MIT, Cambridge, Mass.). *Science*, vol. 190, Nov. 28, 1975, p. 906-908. 34 refs. Grant No. NGR-22-009-025.

Human eye tracking of a foveal afterimage during angular head oscillation in the dark produced smooth eye movements exceeding those for normal vestibular nystagmus, and a reduction in the frequency of the fast phase component of nystagmus eye movements. These results may support a closed loop extension of the corollary discharge theory, with oculomotor commands based on perceived object velocity. (Author)

A76-13545 # **Participation of microorganisms oxidizing gaseous hydrocarbons in the biospheric carbon cycle (Uchastie mikroorganizmov, okisliaiushchikh gazoobraznye uglevodorody v krugovorote ugleroda biosfery).** Iu. R. Malashenko, V. A. Romanovskaia, and V. I. Lial'ko (Akademiia Nauk Ukrainskoi SSR, Institut Mikrobiologii i Virusologii and Institut Geologicheskikh Nauk, Kiev, Ukrainian SSR). *Akademiia Nauk SSSR, Izvestiia, Seriia Biologicheskaia*, Sept.-Oct. 1975, p. 682-693. 42 refs. In Russian.

Results are presented on the ecology and physiology of carbon nutrition of microorganisms utilizing natural hydrocarbon gases as a unique source of carbon and energy, along with the estimation of the part played by these microorganisms in the turnover of biospheric carbon. The vast abundance in natural areas of obligate methylotrophs having the property of utilizing only methane as carbon-energy source indicates that bacterial uptake of methane is a widespread phenomenon and serves as a factor regulating its concentration in the atmosphere. Methane is shown to be a carbon-containing compound whose biospheric content makes it rank second to carbon dioxide carbon storage. Obligate methylotrophs prove to be the only biocatalytic systems which are capable of accumulating and transforming the carbon contained in methane. Hydrocarbon gases of geochemical origin, as distinct from biological, should be regarded as a constant additional carbon-energy source entering into the biosphere, which helps replenish the carbon and energy resources of the biosphere as well as decontaminate the atmosphere from methane. S.D.

A76-13546 # **Mechanism of the visual perception of motion (O mekhanizme zritel'nogo vospriiatiia dvizheniia).** E. A. Ivanov and N. N. Lebedeva (Akademiia Nauk SSSR, Institut Vysshei Nervnoi Deiatel'nosti i Neirofiziologii, Moscow, USSR). *Akademiia Nauk SSSR, Izvestiia, Seriia Biologicheskaia*, Sept.-Oct. 1975, p. 701-712. 6 refs. In Russian.

A logic mathematical model is proposed for the visual perception of motion by man. The model is based on the space-time processing of signals in the retina and on a statistical theory for signal separation out of the noise present in the optical system of the human eye. The model is shown to be consistent with experimental results. It makes it possible to determine the relative level of internal noise of the visual system, the mean propagation rate of a stimulus from photoreceptors over the retina, and other relevant characteristics. S.D.

A76-13551 **Thermal responses of unclothed men exposed to both cold temperatures and high altitudes.** L. F. Cipriano and R. F. Goldman (U.S. Army, Research Institute of Environmental Medicine, Natick, Mass.). *Journal of Applied Physiology*, vol. 39, Nov. 1975, p. 796-800. 18 refs.

Six resting men were exposed to three temperatures (15.5, 21, and 26.5 C) for 120 min at three altitudes (sea level, 2,500 m, and 5,000 m). A 60-min sea-level control at the scheduled temperature preceded the nine altitude episodes. Comparison of the base-line results at any one temperature showed no differences between rectal temperatures or mean weighted skin temperatures. After 120 min, these parameters not only depended on ambient temperature but also on altitude. The initial rate of fall in rectal temperature increased with altitude and equilibrium occurred earlier. At 15.5 C rectal temperature was 0.3 C lower at 5,000 m and 0.2 C lower at 2,500 m than at sea level. Skin temperature was almost 2 C higher at 15.5 C at 5,000 m and 1 C higher at 2,500 m than at sea level. (Author)

A76-13576 **Transfer functions for arterial oxygen saturation during +Gz stress.** K. K. Gillingham and R. R. Burton (USAF, School of Aerospace Medicine, Brooks AFB, Tex.). *Aviation, Space, and Environmental Medicine*, vol. 46, Nov. 1975, p. 1329-1335.

Discrete, finite, Fourier transforms of input +Gz stress and output arterial oxygen saturation were used to obtain transfer functions between G and arterial oxygen saturation in 12 subjects. Ensemble averaging of transfer functions based on responses to variable G stress provided reasonable capability for predicting arterial oxygen saturation responses to sustained 6-G stress. Prediction of responses to variable G stress from transfer functions based on responses to sustained G stress was unsuccessful. A synthetic transfer function with physiologic explicability and substantial predictive ability was obtained from an impulse response fabricated from simple mathematical functions. (Author)

A76-13577 * **Vestibular-ocular accommodation reflex in man.** B. Clark, R. J. Randle, and J. D. Stewart (San Jose State University, San Jose; NASA, Ames Research Center, Moffett Field, Calif.). *Aviation, Space, and Environmental Medicine*, vol. 46, Nov. 1975, p. 1336-1339. 18 refs. Grant No. NGL-05-046-002.

Stimulation of the vestibular system by angular acceleration produces widespread sensory and motor effects. The present paper studies a motor effect which has not been reported in the literature, i.e., the influence of rotary acceleration of the body on ocular accommodation. The accommodation of 10 young men was recorded before and after a high-level deceleration to zero velocity following 30 sec of rotating. Accommodation was recorded continuously on an infrared optometer for 110 sec under two conditions: while the subjects observed a target set at the far point, and while they viewed the same target through a 0.3-mm pinhole. Stimulation by high-level rotary deceleration produced positive accommodation or a pseudomyopia under both conditions, but the positive accommodation was substantially greater and lasted much longer during fixation through the pinhole. It is hypothesized that this increase in accommodation is a result of a vestibular-ocular accommodation reflex. (Author)

A76-13578 **Effects of 100% oxygen on cell division in lung alveoli of squirrel monkeys.** J. D. Hackney, M. J. Evans, and C. E. Spier (Rancho Los Amigos Hospital, Downey; Stanford Research Institute, Menlo Park, Calif.). *Aviation, Space, and Environmental Medicine*, vol. 46, Nov. 1975, p. 1340-1342. 10 refs. Contract No. N00014-70-C-0306; Grants No. NIH-HL-15098; No. NIH-71-2151.

The paper evaluates the effects of 100% oxygen on cell division in lung alveoli of squirrel monkeys. Squirrel monkeys were exposed to 100% oxygen for up to 5 days. Prior to sacrifice, cells preparing to divide were labeled with tritiated thymidine. Labeled cells were visualized with autoradiographic techniques, counted with the light microscope, and expressed in terms of a labeling index. It was shown

that DNA synthesis was initially inhibited by exposure to 100% oxygen. However, within 3 days it was returning to normal and by 5 days was well above control levels. Analysis of the cell types involved showed that the large increase in labeling was due to an increase in dividing type-2 cells, which is thought to be for replacement of damaged type-1 cells. (Author)

A76-13579 **Motion sickness questionnaire and field independence scores as predictors of success in naval aviation training.** R. S. Kennedy (U.S. Navy, Pacific Missile Test Center, Point Mugu, Calif.). *Aviation, Space, and Environmental Medicine*, vol. 46, Nov. 1975, p. 1349-1352. 28 refs.

The present report has shown that a motion sickness questionnaire can be used to predict susceptibility to motion sickness or flight training success, depending on the items scored. There is a discussion of the theory that motion sickness results from conflicting perceptual inputs. This theory is related to aircraft operating conditions. Scores on a personality test which appear to be related to similar perceptual phenomena are related to aviation success. One phenotype, field independence, seems to be promising in this regard. In addition to use of this finding in aviator selection, it is felt that studies of this trait, as it relates to an ability to reconcile conflict and to motion sickness insusceptibility, should be conducted. (Author)

A76-13580 **Effect of isolated head heating and cooling on sweating in man.** T. V. McCaffrey, G. S. Geis, J. M. Chung, and R. D. Wurster (Loyola University, Maywood, Ill.). *Aviation, Space, and Environmental Medicine*, vol. 46, Nov. 1975, p. 1353-1357. 17 refs. Grant No. NIH-HL-08682.

A76-13581 * **Renal effects of continuous negative pressure breathing.** M. J. Kinney (U.S. Public Health Service Hospital, Staten Island, N.Y.). *Aviation, Space, and Environmental Medicine*, vol. 46, Nov. 1975, p. 1358-1362. 12 refs. NASA Order T-2950-A; PHS Project SI75-32-73.

Continuous negative pressure breathing (CNPB) was utilized to simulate the thoracic vascular distension of zero G in 11 anesthetized rats. The animals underwent renal clearance and micropuncture renal nephron studies before, during, and after CNPB. Four rats were pretreated with a high salt diet and I-M desoxycorticosterone (DOCA) in excess. None of these rats diuresed with CNPB. In contrast, five of the seven remaining rats increased the fraction of the filtered sodium excreted and their urinary flow rate. Potassium excretion increased. End proximal tubular fluid specimen's TF/P inulin ratios were unchanged. Whole kidney and single nephron glomerular filtration rates fell 10%. CNPB, a mechanism for atrial distension, appears to cause in the rat a decrease in distal tubular sodium and water reabsorption. Exogenous mineral-corticoid prevents the diuresis, saluresis, and kaluresis. The adequacy of other nonatrial volume control mechanisms in regulating renal salt and water conservation in opposition to the studied atrial-renal (Henry-Gauer) reflex of thoracic vascular distension is confirmed. (Author)

A76-13582 **Effects of mechanical vibration on rat plasma calcium, magnesium, phosphate, and xanthine oxidase.** F. C. Kosmakos, E. C. Keller, Jr., and W. E. Collins (West Virginia University, Morgantown, W. Va.). *Aviation, Space, and Environmental Medicine*, vol. 46, Nov. 1975, p. 1363-1367. 30 refs.

A76-13583 **Effects of altering monoamine metabolism on the adrenocortical response to hypoxia.** S. F. Marotta and A. M. Garcy (Illinois, University, Chicago, Ill.). *Aviation, Space, and Environmental Medicine*, vol. 46, Nov. 1975, p. 1368-1372. 24 refs. NR Project 201-020.

A76-13584 **Head-coupled display visual design considerations.** G. T. Chisum (U.S. Naval Material Command, Naval Air Development Center, Warminster, Pa.). *Aviation, Space, and Environmental Medicine*, vol. 46, Nov. 1975, p. 1373-1377. 6 refs.

Several key areas of visual constraints which must be considered by designers of head-coupled displays are highlighted. Classical data related to the constraints are examined and the implications for the design constraints are evaluated. (Author)

A76-13585 **Heart biochemical responses in miniature swine subjected to +Gz acceleration.** R. T. Dowell, L. A. Sordahl, J. N. Lindsey, H. L. Stone, and H. H. Erickson (Texas, University, Galveston; USAF, School of Aerospace Medicine, Brooks AFB, Tex.). *Aviation, Space, and Environmental Medicine*, vol. 46, Nov. 1975, p. 1378-1382. 26 refs. Grant No. AF-AFOSR-74-2622.

A76-13586 **Anthropometric sizing program for oral-nasal oxygen masks based on 1967 U.S. Air Force survey data.** J. T. McConville (Webb Associates, Yellow Springs, Ohio) and M. Alexander (USAF, Aerospace Medical Research Laboratory, Wright-Patterson AFB, Ohio). *Aviation, Space, and Environmental Medicine*, vol. 46, Nov. 1975, p. 1383-1389. 9 refs. Contract No. F33615-75-C-5003.

A76-13587 **Laboratory assessment of the AN/PVS-5 night vision goggle.** G. T. Chisum and P. E. Morway (U.S. Naval Material Command, Naval Air Development Center, Warminster, Pa.). *Aviation, Space, and Environmental Medicine*, vol. 46, Nov. 1975, p. 1390-1394.

Laboratory assessment of the AN/PVS-5 night vision goggle was conducted. Visual fields, goggle infrared source, useable range, and detectability of targets with the goggle were measured. Illumination levels of -8.37 and -9.17 log lm per sq cm were adequate for 90% detection of 0.14 and 0.07 acuity targets, respectively. Calculations of distances at which various surface and airborne targets subtended comparable visual angles and tables of natural brightness conditions are presented to permit translation of laboratory values into field conditions. While further field evaluation is anticipated, the laboratory assessment indicates that the goggle can significantly facilitate aircrew night visual performance. (Author)

A76-13588 **Cardiac injuries in aircraft occupants resulting from aircraft accidents.** S. Krefft (Bundesministerium der Verteidigung, Flugmedizinisches Institut, Fürstenfeldbruck, West Germany). *Aviation, Space, and Environmental Medicine*, vol. 46, Nov. 1975, p. 1395-1402. 46 refs.

It is reported that relatively frequent injuries to the thorax and to the heart are established in autopsies of aircraft fatalities. A review of 128 autopsy records of aircraft accident fatalities revealed 111 cases of severe contact injuries to the thorax and 98 cases of traumatic injuries to the pericardium and the heart. Accepting the fact that persons injured in traffic accidents display cardiac injuries in 25% of the cases, the number of traumatic heart lesions inflicted in persons in aircraft accidents is three times as high, a fact which may be attributed to the far higher speeds of the aircraft at the moment of impact with resultant forces of deceleration. Causes and mechanisms of the development of cardiac lesions as well as necessary recommendations for the improvement of the health protection of aircraft occupants are discussed. (Author)

A76-13589 **Evaluation of possible microwave-induced lens changes in the United States Air Force.** D. E. Shacklett, T. J. Tredici, and D. L. Epstein (USAF, School of Aerospace Medicine, Brooks AFB, Tex.). *Aviation, Space, and Environmental Medicine*, vol. 46, Nov. 1975, p. 1403-1406. 18 refs.

An Air Force examination team performed ophthalmologic examinations on 817 subjects in a double blind fashion. The subjects included 477 workers in the microwave radiation field and 340 control subjects with no known history of occupational exposure to microwave radiation. The intent of the study was to determine if a significant difference existed between the two groups for the presence of three lenticular findings equated with early cataract formation. No significant difference was found. Thus, this study does not support the contention that microwave exposure in the military

environment is causing human cataracts at levels permitted by U.S. Safety Standards. (Author)

A76-13590 **Heart rate monitoring of pilots during steep-gradient approaches.** A. H. Roscoe (Royal Aircraft Establishment, Bedford, Hants., England). *Aviation, Space, and Environmental Medicine*, vol. 46, Nov. 1975, p. 1410-1413.

As part of a large scale investigation into noise abatement landing approaches, one trial involved the flight evaluation of steep-gradient and two-segment approaches; these were 3, 6, 7.5, and 9 deg single-segment, and 7.5 deg/3 deg two-segment approaches. To augment the subjective opinions of the test pilots, their heart rates were monitored during all the experimental runs. The resulting heart rate values for the different approaches correlated reasonably well with the subjective ratings of the relative workload levels. There is some evidence that the pilot workload level for the 7.5 deg/3 deg approaches is of the same order as the level for the conventional 3 deg gradient. (Author)

A76-13603 **A study of the subjective equivalence of noise and whole-body vibration.** D. B. Fleming and M. J. Griffin (Southampton, University, Southampton, England). *Journal of Sound and Vibration*, vol. 42, Oct. 1975, p. 453-461. 10 refs.

An experiment has been conducted to determine the subjective equivalence of 1000 Hz pure tone noise and 10 Hz sinusoidal whole-body vertical vibration. Each of 20 male subjects was exposed to all 64 possible combinations of 8 levels of noise (65 dB to 100 dB SPL) and 8 levels of vibration (0.20 to 1.2 m/sec/sec rms). The noise was presented via circumaural headphones and the vibration exposure was by means of a flat hard seat. Both stimuli were presented simultaneously for a period of ten seconds and subjects were asked to indicate whether, if they were to be presented with the combination again, they would prefer that the noise or the vibration should be reduced. The results are presented in a form that enables an estimate to be made of the percentage of subjects who prefer reduced noise or vibration at any of the given combinations of the two stimuli. It is considered that such results could be employed as a guide to reducing either the noise or the vibration in some environments. (Author)

A76-13625 **Are solar neutrinos detected by living things.** M. Ruderfer (Dimensions, Inc., Hempstead, N.Y.). *Physics Letters*, vol. 54 A, Oct. 6, 1975, p. 363, 364. 9 refs.

Scattering of electrons by solar neutrinos induces an inherently detectable noise frequency approximately 100 Hz per gram of active mammalian brain tissue based on a scattering cross-section previously shown to satisfactorily explain the Davis solar neutrino experiment. (Author)

A76-13799 * **Psychological aspects of aeronautical flight simulation.** E. M. Huff and D. C. Nagel (NASA, Ames Research Center, Moffett Field, Calif.). *American Psychologist*, Mar. 1975, p. 426-439. 46 refs.

Attention is given to the class of ground based devices which have been used by scientists, engineers, and test pilots to evaluate current or future aircraft systems. The characteristics of a flight simulator and its major subsystems are considered, taking into account simulator cockpits, visual scene attachments, aspects of visual attachment fidelity, simulator motion systems, motion system fidelity, and simulation computer systems. Questions related to psychological research and simulation are examined. Simulator validity criteria are discussed along with problems of subsystem fidelity. G.R.

A76-13811 # **Relations between the posterior lateral nucleus of the thalamus and the cortex of the suprasylvian convolution in the cat (O sviaziakh zadnego lateral'nogo iadra talamusa s koroi suprasil'vievoi izviliny koshki).** D. P. Artemenko, T. M. Mamonets, and B. I. Fomovskii (Akademiia Nauk Ukrainskoi SSR, Institut Fiziologii, Kiev, Ukrainian SSR). *Neirofiziologiia*, vol. 7, no. 5, 1975, p. 500-508. 20 refs. In Russian.

A76-13812 # **Investigation of the electrical activity of the spinal cord with local depression of inhibitory processes (Issledovanie elektricheskoi aktivnosti spinnogo mozga pri ochagovom ugnetenii protsessov tormozheniia).** V. K. Lutsenko and G. N. Kryzhanovskii (Akademiia Meditsinskikh Nauk, Moscow, USSR). *Neirofiziologiia*, vol. 7, no. 5, 1975, p. 509-518. 30 refs. In Russian.

The stimulation of the ipsolateral cutaneous hind leg nerve in rats subjected to unilateral tetanic intoxication of the lumbar segments of the spinal cord (local depression of inhibitory processes) is shown to enhance the potentials of the dorsal roots in amplitude and especially in duration, as well as to induce a P-wave in the potential of the dorsal surface and negative potentials in the ventral crescents of the gray matter. Also discussed are the mechanisms underlying the spreading of the spasmodic activity beyond the lesion seat of inhibitory processes, along with localization of the structures responsible for the spreading spasmodic activity. S.D.

A76-13911 # **Matching of biological and engineering elements and systems (Soglasovanie biologicheskikh i tekhnicheskikh elementov i sistem).** Iu. I. Zozulia. *Problemy Bioniki*, no. 14, 1975, p. 12-19. 8 refs. In Russian.

The paper discusses the conditions necessary for matching the input-output relationships of nonlinear dynamic systems without memory and with image memory. A structural representation is provided for the input-output relationships of matched elements and systems with distributed kernels. S.D.

A76-13912 # **Investigation of the propagation of a stimulus in a neuron network modeling the cortex (Issledovanie rasprostraneniia vozbuzhdeniia v neironnoi seti, modeliruiushchei koru mozga).** A. G. Borzenko and A. V. Dabagian. *Problemy Bioniki*, no. 14, 1975, p. 19-23. In Russian.

The paper describes the mathematical model of a neuron network consisting of formal neurons characterized by a refractory period and threshold, with the axons being responsible for signal delay. The designed mathematical model is consistent with experimental findings and satisfactorily reflects the processes taking place in an actual cortex. It is shown that damages to the cortex do not necessarily result in loss of information. S.D.

A76-13914 # **Involuntary saccadic movements of the eye - A biological modulator of information in the visual process (Neproizvol'nye sakkadicheskie dvizheniia glaz - Biologicheskii moduliator informatsii v zritel'nom protsesse).** V. F. Ananin. *Problemy Bioniki*, no. 14, 1975, p. 47-51. 9 refs. In Russian.

A76-13915 # **Mathematical models for representing certain types of mechanical motion (Matematicheskie modeli otobrazheniia nekotorykh vidov mekhanicheskogo dvizheniia).** S. F. Katsalap. *Problemy Bioniki*, no. 14, 1975, p. 51-58. In Russian.

The mathematical models of the functional properties of the neuron structures in the visual analyzer which predominantly respond to the movement of a stimulus (object) as well as to the movement of the object in a certain direction have been previously described by the author (1974). The present paper presents nonlinear differential operators for inferring several other characteristics of the translation motion of the stimulus as well as an operator for measuring its rotational motion. S.D.

A76-13916 # **Perception of noise by the auditory analyzer in man (K voprosu o vospriiatii shumov slukhovym analizatorom cheloveka).** S. A. Usenko. *Problemy Bioniki*, no. 14, 1975, p. 58-61. In Russian.

The paper studies specific psychophysiological phenomena associated with the perception of noise by the human auditory analyzer and develops their mathematical model. In particular, the

study investigates whether the frequency spectrum of band-limited noise defines uniquely noise perception or there may be such a situation where two noises having different frequency spectra are perceived as being identical. The test signals are heard as being identical only when their spectra coincide, and the auditory analyzer is found to respond to the entire envelope of the frequency spectrum. This curve uniquely defines noise perception by man. S.D.

A76-13917 # **Simulation of synchronous and asynchronous potentials of the brain. I (Modelirovanie sinkhronnykh i asinkhronnykh potentsialov golovnogo mozga. I).** G. A. Kolotenko. *Problemy Bioniki*, no. 14, 1975, p. 68-75. 12 refs. In Russian.

The paper discusses some aspects of simulation and analysis of synchronous and asynchronous biopotentials distributed in two or more regions in the brain. The analysis assumes the EEG to be a random process. A systems analysis for evaluating the synchronous potentials is presented, which makes it possible to separate the set of simultaneous EEG oscillations characterized by a probability component in the distribution of weighted coded potentials. The possibility of identifying the dynamics of pertinent constellations is revealed. S.D.

A76-13918 # **Opticotelevision model for the receptive fields of the visual analyzer (Optiko-televizionnaia model' retseptivnykh polei zritel'nogo analizatora).** V. G. Abdula, Iu. P. Bugai, V. A. Bakhtigozin, and V. G. Chernov. *Problemy Bioniki*, no. 14, 1975, p. 76-78. In Russian.

A76-13919 # **Use of television systems for space-time filtration of images. I (Ispol'zovanie televizionnykh sistem dlia prostranstvenno-vremennoi fil'tratsii izobrazhenii. I).** Iu. I. Nefedov. *Problemy Bioniki*, no. 14, 1975, p. 78-85. 18 refs. In Russian.

It has been established that mathematical and television models of detectors for the visual analyzer are suitable for determining relevant weight functions and for evaluating the functional potentials of electronic and optical space-time filters. Earlier results are used to design television filters of images. An algorithm is formulated for the synthesis of space-time filters used in television systems. The possibility of spatial filtration of images on a tube screen is demonstrated. Results point to the suitability of television filters for solving problems related to on-line data processing. S.D.

A76-14045 # **Microorganisms in the stratosphere (O mikroorganizmakh stratosfery).** A. A. Imshenetskii, S. V. Lysenko, and G. A. Kazakov (Akademiia Nauk SSSR, Institut Mikrobiologii, Moscow, USSR). *Akademiia Nauk SSSR, Doklady*, vol. 224, Sept. 1, 1975, p. 223-225. In Russian.

In an attempt to study the upper boundary of the biosphere, meteorological rockets were used to sample air at heights of up to 100 km. After ejection of the nose cone and the analyzer lid, aerosol particles and microorganisms were captures directly by the nutrient material contained in the analyzer. Among the colonies of microorganisms captured at stratospheric heights were microscopic fungi of Circinella muscae, Penicillium, Aspergillus niger, and Mycelia sterilia. Photographs of these microrganisms are given and discussed. The equipment used in the experiments was thoroughly sterilized. V.P.

A76-14071 **The incidence and clinical implications of coronary artery spasm.** R. A. Chahine, A. E. Raizner, T. Ishimori, R. J. Luchi, and H. D. McIntosh (Baylor University; U.S. Veterans Administration Hospital, Houston, Tex.). *Circulation*, vol. 52, Dec. 1975, p. 972-978. 24 refs.

The total incidence of coronary artery spasm during coronary angiography has been reported to be between 0.26% and 0.93%. The rarity of this phenomenon has been invoked to minimize its clinical significance. Review of a one-year experience in the catheterization laboratory showed that coronary spasm occurred in eight of 274 coronary angiograms (2.93%). In three instances, spasm could not be ascribed to catheter tip irritation, and was considered to be spontaneous. Since multiple factors during coronary arteriography might inhibit the occurrence of coronary spasm, it is believed that the incidence of spontaneous spasm may be higher than can be documented during angiography. Coronary spasm may have important clinical significance in various chest pain syndromes and greater methodical attention should be directed toward this phenomenon. (Author)

A76-14072 **Observer agreement in evaluating coronary angiograms.** K. M. Detre, E. Wright, M. L. Murphy, and T. Takaro (U.S. Veterans Administration Hospital, West Haven; Yale University, New Haven, Conn.; Pittsburgh, University, Pittsburgh, Pa.; U.S. Veterans Administration Hospital, Little Rock, Ark.; U.S. Veterans Administration Hospital, Ashville, N.C.). *Circulation*, vol. 52, Dec. 1975, p. 979-986. 9 refs. Research sponsored by the U.S. Veterans Administration.

The reliability of interpretation of coronary arteriography as a diagnostic tool was investigated. Twenty-two physicians with varying levels of experience read 13 cine-angiograms - blind - on two different occasions. Analysis of inter- and intraobserver variability showed that angiographic items about which observers were most inconsistent from one reading to the other had the largest interobserver disagreement. They were the distal portions of the left anterior descending and left circumflex arteries. Among the items on which there was most consistent agreement - namely, the right main coronary artery and presence of ventricular aneurysm - there was most often agreement between observers. When individual readers were evaluated, some observers were far more consistent in their own readings of all the angiographic items than others. This intraobserver agreement in turn correlated fairly well with how often they agreed with the other observers and with how much experience they reported having in reading coronary cine-angiograms. (Author)

A76-14073 **Left ventricular function in tricuspid atresia - Angiographic analysis in 28 patients.** M. A. LaCorte, M. Dick, G. Scheer, C. G. LaFarge, and D. C. Fyler (Children's Hospital Medical Center; Harvard University, Boston, Mass.). *Circulation*, vol. 52, Dec. 1975, p. 996-1000. 20 refs. Grants No. NIH-HL-10436; No. NIH-HL-05855. PHS Project 260.

A76-14074 **Time dependent changes in the functional properties of the atrioventricular conduction system in man.** C. P. Reddy, A. N. Damato, M. Akhtar, J. B. Ogunkelu, A. R. Caracta, J. N. Ruskin, and S. H. Lau (U.S. Public Health Service Hospital, Staten Island, N.Y.). *Circulation*, vol. 52, Dec. 1975, p. 1012-1022. 26 refs. Grant No. NIH-HE-12536-04. PHS Project PY 75-1.

Time-dependent changes in the electrophysiological properties of the atrioventricular conducting system (AVCS) were determined at two or more cycle lengths in 22 patients using bundle of His (H) electrograms, incremental atrial pacing and atrial extrastimulus method. The atrioventricular and intraventricular (H-V interval) conduction times and refractory periods of the atrium, the A-V node (AVN) and His-Purkinje system (HPS) were measured during the control period, and repeat measurements were made after a 30 minute interval in eight patients (group A), after a 60 minute interval in nine (group B) and after 30 and 60 minute intervals in five (group C). No statistically significant changes from control values were seen after 30 and 60 minute intervals in any group in sinus rate, A-V nodal conduction time and the onset of A-V nodal Wenckebach block. Only the functional refractory period of the AVN showed a statistically significant decrease from control values in groups B and C. These observations confirm the reproducibility of electrophysiological properties of AVCS within one hour. (Author)

A76-14075 **Left ventricular performance assessed by radionuclide angiocardiography and echocardiography in patients with previous myocardial infarction.** H. Henning, H. Schelbert, M. H. Crawford, J. S. Karliner, W. Ashburn (California, University, La Jolla, Calif.), and R. A. O'Rourke. *Circulation*, vol. 52, Dec. 1975, p. 1069-1075. 21 refs. Grant No. NIH-N01-HV-81332.

A76-14156 * **Perception of linear horizontal self-motion induced by peripheral vision /linearvection/ - Basic characteristics**

and visual-vestibular interactions. A. Berthoz, B. Pavard, and L. R. Young (CNRS and Conservatoire National des Arts et Métiers, Laboratoire de Physiologie du Travail, Paris, France). *Experimental Brain Research*, vol. 23, Nov. 14, 1975, p. 471-489. 32 refs. Research supported by the Organisme National de Sécurité Routière, Centre National de la Recherche Scientifique, and Conservatoire National des Arts et Métiers of France; Grant No. NGR-22-009-701.

The basic characteristics of the sensation of linear horizontal motion have been studied. Objective linear motion was induced by means of a moving cart. Visually induced linear motion perception (linearvection) was obtained by projection of moving images at the periphery of the visual field. Image velocity and luminance thresholds for the appearance of linearvection have been measured and are in the range of those for image motion detection (without sensation of self motion) by the visual system. Latencies of onset are around 1 sec and short term adaptation has been shown. The dynamic range of the visual analyzer as judged by frequency analysis is lower than the vestibular analyzer. Conflicting situations in which visual cues contradict vestibular and other proprioceptive cues show, in the case of linearvection a dominance of vision which supports the idea of an essential although not independent role of vision in self motion perception. (Author)

A76-14157 **Temporal frequency characteristics of spatial interaction in human vision.** S. Magnussen and A. Glad (Oslo, University, Oslo, Norway). *Experimental Brain Research*, vol. 23, Nov. 14, 1975, p. 519-528. 36 refs. Research supported by the Norges Almenvitenskapelige Forskningstad.

In psychophysical experiments the bright-dark contrast effects observed in a steady test-field were measured as a function of the temporal frequency of an inducing-field modulated symmetrically about the test-field luminance. The frequency-contrast functions obtained from these measurements were interpreted as reflecting the temporal frequency characteristics of the lateral pathways within the B and D systems (the on-center and off-center neurons) in human vision. Psychophysical evidence is further presented that the lateral neural pathways have lower temporal cut-off frequencies than the 'straight-through' pathways. The results are discussed in terms of the frequency characteristics of the center and surround of the receptive fields of on-center and off-center neurons. It is doubtful, however, whether the psychophysical results can be fully explained by the properties of the single-unit receptive field mechanism. (Author)

A76-14158 **The Aubert-Fleischl phenomenon - A temporal frequency effect on perceived velocity in afferent motion perception.** J. Dichgans, H. C. Diener, T. Brandt (Neurologische Universitätsklinik, Freiburg im Breisgau, West Germany), and E. Wist. *Experimental Brain Research*, vol. 23, Nov. 14, 1975, p. 529-533. 13 refs. Deutsche Forschungsgemeinschaft Grant No. SFB-70.

Apparent velocities of moving visual stimuli are known to be different depending on whether the subject pursues the stimulus (efferently controlled motion perception) or whether the eye is stationary and the image moves across the retina (afferent motion perception). Afferent motion perception of a periodic pattern or a moving single object causes overestimation of velocity (magnitude estimations) as compared to smooth pursuit. This socalled Aubert-Fleischl phenomenon is shown to depend on local temporal frequency stimulation on the retina caused by the repetitive passage of contrast borders of the moving periodic pattern. This is evidenced by the fact that for a given stimulus speed the amount of overestimation is a function of the spatial frequency of the pattern (or the angular subtend of a single moving object) and that the Aubert-Fleischl phenomenon is not observed if a single edge moves. Background characteristics seem not to influence the apparent velocity during smooth pursuit. (Author)

A76-14446 **Model calculations for the terrestrial carbon cycle - Carbon isotope geochemistry and evolution of photosynthetic oxygen.** C. E. Junge, M. Schidlowski, R. Eichmann, and H. Pietrek (Max-Planck-Institut für Chemie, Mainz, West Germany). *Journal of Geophysical Research*, vol. 80, Nov. 20, 1975, p. 4542-4552. 27 refs. Research supported by the Deutsche Forschungsgemeinschaft.

A76-14499 **Processing of information about location in brief visual displays.** D. G. Lowe (Trent University, Peterborough, Ontario, Canada). *Perception and Psychophysics*, vol. 18, no. 5, Nov. 1975, p. 309-316. 9 refs. Research supported by Trent University; National Research Council of Canada Grant No. APA-231.

Within the context of the selective masking effect reported by Merikle, Coltheart, and Lowe (1971), a series of five experiments investigated the utility of bar-marker probes as a poststimulus sampling procedure for partial report of brief visual displays. It was demonstrated that bar markers are inadequate as partial-report cues because subjects cannot properly locate the positions of the probes. An improved bar-marker procedure was developed which removed this problem of cue localization. Furthermore, it was shown that subjects, when given the opportunity, are able to report much more from brief visual displays than the bar-marker procedure typically permits. It was also suggested that subjects' ability to employ bar-marker probes is governed by quite different factors than their capacity to report the contents of brief visual displays. (Author)

A76-14582 **Night vision systems for Army aviation.** C. J. Arduini (U.S. Army, Night Vision Laboratory, Fort Belvoir, Va.). In: American Helicopter Society, Annual National Forum, 31st, Washington, D.C., May 13-15, 1975, Proceedings. New York, American Helicopter Society, Inc., 1975. 7 p.

The paper discusses some of the basic principles of combat aviation night vision technology, the application of the technology to typical combat scenarios, and some test results indicating the capabilities and limitations of recently developed night flying equipment. Some night vision goggles (NVG) originally developed for individual soldiers were modified for pilot applications, but have shown several shortcomings as a pilot system. The best approach for a high performance target acquisition sensor has been forward looking infrared imaging (FLIR). It is completely passive in operation, independent of light level, and has significant smoke, haze, and camouflage penetration capability. P.T.H.

A76-14649 # **Circadian periodicity involving physiological and psychological variables in the case of seven blind subjects with and without timer (Circadiane Periodik physiologischer und psychologischer Variablen bei 7 blinden Versuchspersonen mit und ohne Zeitgeber).** R. Lund. München, Technische Universität, Fakultät für allgemeine Wissenschaften, Doktor der Philosophie Dissertation, 1974. 139 p. 92 refs. In German.

The variables considered in the studies are related to the urinary functions, cortisol secretion, catecholamine excretion, rectal temperature, 10-sec-interval estimation, reaction time, and tapping tests. It is concluded on the basis of the obtained results that light and light-darkness changes are not needed for the maintenance and the occurrence of circadian rhythms or for physiological or psychological functions. It appears, however, that light and light-darkness changes have an effect on the rectal temperature and on the phase relations concerning the steroid levels in men. G.R.

A76-14998 # **The organization of voluntary motion: Neurophysiological mechanisms (Organizatsiia proizvol'nogo dvizheniia: Neirofiziologicheskie mekhanizmy).** Ia. M. Kots. Moscow, Izdatel'stvo Nauka, 1975. 248 p. 498 refs. In Russian.

The book considers the neurophysiological mechanisms for organizing voluntary motion in man and the higher animals. Spinal neural mechanisms for such organization are described, together with supraspinal control of the segmental motor system in man. Also discussed are the dynamics of the complex adjustments in the state of various brain and spinal neural systems which are responsible for organizing voluntary motion. B.J.

A76-14999 # **Mathematical modeling of cerebral blood circulation and gas exchange (Matematicheskoe modelirovanie krovoobrashcheniia i gazoobmena v mozgu).** Iu. Ia. Kisliakov. Leningrad, Izdatel'stvo Nauka, 1975. 132 p. 229 refs. In Russian.

The present work deals with the theoretical aspects and practical methods of developing mathematical models for the blood vessels, hemodynamics, and gas exchange in the brain. The possibilities of a systems approach in studying complex physiological processes are demonstrated. Results of modeling are used to analyze the mechanisms underlying the formation of pulsed fluctuations of cerebrospinal fluid pressure, the passive and active properties of blood vessels, and the filtration processes taking place in the brain. Particular attention is given to the problems concerning the influence of morphological parameters, hemodynamic conditions, and intensity of oxygen consumption by the brain on the partial pressure of oxygen and carbon dioxide in the cerebral blood and tissue. A three-dimensional model is used to illustrate the procedure for calculating the distribution of oxygen pressure in nerve cells. S.D.

A76-15050 # **The man-computer interface problem in terminal automation.** L. Innes (Defence and Civil Institute of Environmental Medicine, Downsview, Ontario, Canada). *CATCA Journal*, vol. 7, Fall 1975, p. 11-13. 18 refs.

The performance of ATC automation programs currently in use is assessed. The advantages and disadvantages of proposed systems requiring the implementation of several possible levels of automation are considered. It has been found that the additional tasks imposed by the demands of the automated areas of the ATC system frequently increase workloads to an unacceptable degree. Elimination or reduction of the requirements for man-computer interaction is essential to the advantageous application of ATC automation. C.K.D.

A76-15070 **Inhibition of cortical evoked potentials and sensation by self-initiated movement in man.** D. Papakostopoulos, R. Cooper, and H. J. Crow (Burden Neurological Institute, Bristol, England). *Nature*, vol. 258, Nov. 27, 1975, p. 321-324. 12 refs.

The cortical potentials following externally paced displacement (EPD) and self-paced voluntary displacement (SPD) of the left index finger are investigated together with the evoked responses and subjective sensations following brief electrical stimulation applied to the left median nerve during SPD. It is found that for all subjects, the area characteristic response following EPD diminished, changed in waveform, or disappeared completely when the finger was moved voluntarily. It is also found that all subjects experienced diminished sensation during movement of the stimulated digit. It is proposed that a movement-related selective gating action exerted on the sensory pathways through their course to the cortex can explain the results. F.G.M.

A76-15229 **Transport of pendulum type biped systems.** V. B. Larin. *(Akademiia Nauk SSSR, Izvestiia, Mekhanika Tverdogo Tela*, Mar.-Apr. 1975, p. 58-61.) *Mechanics of Solids*, vol. 10, no. 2, 1975, p. 48-51. 6 refs. Translation.

Vukobratovich et al. (1972) have studied biped mechanisms in which the motion of the compensating mass is a major element of the system dynamics. The dynamic processes involved in the motion of biped walking mechanisms without a compensation mass are analyzed, and problems associated with controlling and stabilizing the motion of such mechanisms are examined. V.P.

A76-15325 **Dynamics of nap sleep during a 40 hour period.** J. M. Moses, D. J. Hord, A. Lubin, L. C. Johnson, and P. Naitoh (U.S. Navy, Naval Health Research Center, San Diego, Calif.). *Electroencephalography and Clinical Neurophysiology*, vol. 39, Dec. 1975, p. 627-633. 18 refs. ARPA Order 1596; Navy Task M4305,07-3008DAC5.

Following one baseline night, the sleep of 8 adult males in equally spaced 1 h naps was investigated over a 40 h period. The amount of stage REM during the naps and the total sleep time were negatively related to the circadian-temperature cycle. A reciprocal positive relation was found between REM and stage 4. Stage REM often occurred within 10 min of stage 1 onset. Autocorrelation and cross-correlation analysis showed that the progression of sleep stages from hour to hour in baseline sleep was altered in sequential naps. No significant differences were observed between baseline and recovery sleep, indicating that naps are of some recuperative value. A second group of men who were sleep-deprived for 40 h, with exercise periods substituted for naps, showed typical sleep-loss effects during recovery sleep. It is suggested that the timing of REM onset may be controlled by a sleep-dependent ultradian clock. C.K.D.

A76-15410 # **Future flight deck design.** R. E. Hillman (British Aircraft Corp., Ltd., Weybridge, Surrey, England) and J. W. Wilson (Hawker Siddeley Aviation, Ltd., Hatfield, Herts., England). In: Symposium on Designing from the Inside Out, London, England, February 6, 1975, Proceedings. London, Royal Aeronautical Society, 1975. 9 p.; Discussion. 2 p.

The paper examines some areas of possible improvements to the flight deck that will determine the most cost effective combination of crew and equipment required for the safe operation of relatively large transport aircraft. Two-man and three-man crew operation are compared, and it is found that in the absence of a third crew member, duties accruing to the two pilots in addition to their flight tasks would consist in (1) normal and abnormal operation of systems, (2) reading and executing check lists, (3) extracting takeoff and approach data and engine power settings, (4) in-flight testing and fault analysis, and (5) recording system defects. The goal of reduced work load with a minimum crew complement while maintaining flight safety can be met only by putting increased reliance on automation of flight control, engine management, systems operation, and self-monitoring of systems. P.T.H.

A76-15437 **Independence of 'ON' and 'OFF' responses of retinal ganglion cells.** M. W. Levine and J. M. Shefner (Illinois, University, Chicago, Ill.). *Science*, vol. 190, Dec. 19, 1975, p. 1215-1217. 12 refs.

Platinum-iridium electrodes were used to record the action potentials in isolated goldfish retinas during repeated exposure to the same stimulus (a flash of deep red monochromatic light). The statistical properties of variations in the response from presentation to presentation are analyzed using an autocorrelation method. Results show that ON response mechanisms have variability that is not shared by other mechanisms. It is suggested that ON and OFF information is generated on the retina by different mechanisms, each containing its own source of variability. C.K.D.

A76-15438 **Cochlear tuning properties - Concurrent basilar membrane and single nerve fiber measurements.** E. F. Evans and J. P. Wilson (Keele, University, Keele, Staffs., England). *Science*, vol. 190, Dec. 19, 1975, p. 1218-1221. 15 refs. Research supported by the Medical Research Council and Science Research Council.

The effect of removal of perilymph from the cochlea on the sharp tuning of cochlear neurons was investigated. Frequency threshold curves of single cochlear fibers were recorded concurrently with broad basilar membrane responses from the same region of the partially drained cat cochlea. The thresholds of the fibers were determined with an automatic computer-controlled paradigm. Mechanical measurements were made with different degrees of drainage exceeding the range over which neural responses changed gradually. No changes in the sharpness of tuning were detected, indicating that changes in the sharpness of tuning of cochlear neurons following removal of the perilymph are not mechanical in origin. A second filter mechanism is apparently required to account for sharpness of tuning. C.K.D.

A76-15462 # **An experiment concerning the relation between sound intensity, situation cognition, and performance (Ein Experiment zum Zusammenhang zwischen Schallstärke, Situations-**

kognition und Leistung). R. Guski (Berlin, Freie Universität, Berlin, West Germany). *Zeitschrift für experimentelle und angewandte Psychologie*, vol. 22, no. 4, 1975, p. 584-599. 27 refs. In German.

Simple reaction time of 202 subjects was measured under conditions of silence and under conditions of white noise varying between 45 db and 110 db in 14 groups. The analysis of the measured performances and cognitive reactions showed that an increase of the sound intensity primarily produces a negative attitude toward the situation, and the observed changes in the performance occur rather due to cognitions than to the physical sound stimulus. The results were considered in the light of the stress theory based on cognition. (Author)

A76-15463 # **Studies on the psychological and psychophysiological effect of repeated four-hour intermittent pink noise (Untersuchungen zur psychologischen und psychophysiologischen Wirkung von wiederholtem vierstündigem, intermittierenden rosa Rauschen).** W. Hawel (Dortmund, Universität, Dortmund, West Germany). *Zeitschrift für experimentelle und angewandte Psychologie*, vol. 22, no. 4, 1975, p. 613-629. 27 refs. In German.

A76-15464 # **The dependence of the electroencephalogram on the personality dimensions E and N sensu Eysenck and on situations representing different levels of activation (Die Abhängigkeit des Elektroenzephalogramms von den Persönlichkeitsdimensionen E und N sensu Eysenck und unterschiedlich aktivierenden Situationen).** F. Rösler (Kiel, Neue Universität, Kiel, West Germany). *Zeitschrift für experimentelle und angewandte Psychologie*, vol. 22, no. 4, 1975, p. 630-667. 42 refs. In German.

In the investigation attention is given to the reliable measurement of the relevant personality dimensions, the objective analysis of the EEG curves with the aid of an automated frequency analysis, and the control of perturbation variables. The main objective of the investigation is a study of the influence of the personality characteristics and the given situation on the EEG. Tests are conducted with 35 male students of the university in Hamburg, West Germany. A Faraday cage with limited sonic insulation was used in the studies. The results of the investigation show that there is no significant relation between the EEG and the personality dimension emotional lability (N). G.R.

A76-15465 # **LEE effect and interference - A planned test related to the connection between delayed auditory feedback and interference (LEE-Effekt und Interferenz - Ein Planversuch zum Zusammenhang von verzögerter akustischer Rückmeldung und Interferenz).** B. Sturm and T. Schulz (Bonn, Universität, Bonn, West Germany). *Zeitschrift für experimentelle und angewandte Psychologie*, vol. 22, no. 4, 1975, p. 668-692. 46 refs. In German.

The motivation for the reported investigation was provided by studies conducted by Bäumler (1970) and Fillenbaum (1963). Relations between delayed auditory feedback and interference effects are examined. A description is given of an experiment which was designed to determine the mean optimal delay and the exact form of the decline in the LEE effect with increasing delay. The results obtained in this experiment were used in the design of the main experiment in which optimal and nonoptimal delay conditions were combined with a presence or absence of interference factors. The significance of the obtained results is discussed and an interference model is developed. G.R.

A76-15469 **Modular software for computer-assisted ECG/VCG interpretation.** J. L. Talmon and J. H. Van Bemmel (Medisch-Fysisch Instituut TNO, Utrecht; Vrije Universiteit, Amsterdam, Netherlands). In: Medinfo 74; Proceedings of the First World Conference on Medical Informatics, Stockholm, Sweden, August 5-10, 1974. Amsterdam, North-Holland Publishing Co., 1974, p. 653-657. 18 refs. Research supported by the Ministry of Health.

The use of computers for analysis of physiological and medical data is increasing rapidly. For ECG analysis a number of systems are available, which, however, have certain limitations and are still not fully accepted by physicians. The system - a software package with modular structure - presented here is designed to overcome such disadvantages. Attention is paid to the reliability and documentation of the different modules of the processing system. Reliability indices are used to give the user insight into the system and to be able to determine whether the final output can also be trusted from a signal processing point of view. The documentation of the system consists of listings of the subroutines, written in USAS Fortran IV, accompanied by extensive comment, together with figures about the performance of the modules. This performance was computed using both a learning and testing population of input information. (Author)

A76-15644 **Life and chirality beyond the earth.** W. Thiemann (Kernforschungsanlage Jülich GmbH, Jülich, West Germany). *Origins of Life*, vol. 6, Oct. 1975, p. 475-481. 28 refs.

An attempt is made to show that the phenomenon of chirality - of which optical activity is but one consequence - is by no means restricted to life on earth, but is common throughout the universe. Several independent sources have been investigated, including statistical fluctuations, stereoselective physical factors, and energetic differences between enantiomeric molecules. It is emphasized that a search for chirality as an indicator for life elsewhere in space provides an excellent tool for the fascinating question of exobiology. Still one must be aware of the limitations of the experimental methods and their interpretations. (Author)

A76-15650 * **High pH, ammonia toxicity, and the search for life on the Jovian planets.** P. H. Deal, K. A. Souza, and H. M. Mack (NASA, Ames Research Center, Moffett Field, Calif.). *Origins of Life*, vol. 6, Oct. 1975, p. 561-573. 18 refs.

The effects of pH and ammonia concentration were studied separately, where possible, on a variety of organisms, including some isolated from natural environments of high pH and/or ammonia concentration. Escherichia coli and Bacillus subtilis are both extremely sensitive to ammonia. An aerobic organism (growth up to pH 11.4) from an alkaline spring is more resistant, but exhibits a toxic response to ammonia at a pH much lower than its maximum for growth. The greatest ammonia resistance has been found in an unidentified organism growing at near neutral pH. Even in this case, however, survival at ammonia concentrations reasonably expected on the Jovian planets is measured in hours. This is two to three orders of magnitude longer than for E. coli. Results support the tentative conclusion that contamination of the Jovian planets with terrestrial organisms that can grow is unlikely. However, the range of toxic response noted, coupled with the observation that terrestrial life has not been exposed to high ammonia concentrations for millions of years, suggests that adaptation to greater ammonia tolerance may be possible. (Author)

A76-15694 **A new method for the simultaneous measurement of the moment of inertia, the damping coefficient and the location of the centre of mass of a body segment in situ.** H. Hatze (South African Council for Scientific and Industrial Research, National Research Institute for Mathematical Sciences, Pretoria, Republic of South Africa). *European Journal of Applied Physiology*, vol. 34, no. 4, 1975, p. 217-226. 12 refs.

A new method which permits, in a single measurement, the determination of the moment of inertia, the angular damping coefficient of the joint and the location of the centre of mass of a body segment in situ is presented. The underlying principle is the theory of small, damped oscillations of a system about its equilibrium position. The fact that the oscillogram contains information about certain parameters of the oscillating system is used to find these parameters. The application of the method is simple and does not require highly sophisticated instrumentation. The results are very reproducable and immediately available. (Author)

A76-15695 **Study of the circadian variation of different circulatory and respiratory functions at submaximal and maximal ergometer work (Untersuchung zur Tagesperiodik verschiedener Kreislauf- und Atemgrössen bei submaximalen und maximalen Leistungen am Fahrradergometer).** J. Ilmarinen, J. Rutenfranz, H. Kylian, and F. Klimt (Dortmund, Universität, Dortmund, West Germany). *European Journal of Applied Physiology*, vol. 34, no. 4, 1975, p. 255-267. 9 refs. In German.

A76-15696 **Changes of pulse rate caused by sonic booms during sleep (Pulsfrequenzänderung durch Überschallknalle während des Schafes).** B. Griefahn (Universitätsklinikum, Essen, West Germany). *European Journal of Applied Physiology*, vol. 34, no. 4, 1975, p. 279-289. 31 refs. In German.

An investigation was conducted concerning the effect produced by brief acoustic stimuli (sonic booms) experienced by subjects during sleep, taking into account the possibility of an occurrence of effects similar to those observed by Lang and Hnatiow (1962) and Hord et al. (1966). Details regarding the tests are discussed along with aspects of data evaluation and statistical processing. The significance of the test results is considered, giving attention to stimulus intensity, exogenic moderators, and endogenic moderators. G.R.

A76-15751 # **The psychophysiological behavior of pilot trainees during their first flight missions and piloting fitness (Comportamento psicofisiologico di allievi piloti durante le prime missioni di volo ed idoneità al pilotaggio).** C. A. Ramacci (Aeronautica Militare, Centro di Studi e Ricerche di Medicina Aeronautica e Spaziale, Rome, Italy) and P. Rota. *(NATO, AGARD, Aerospace Medical Panel Specialists Meeting, 31st, Pozzuoli, Italy, Sept. 16-20, 1974.) Rivista di Medicina Aeronautica e Spaziale*, vol. 38, Jan.-Mar. 1975, p. 3-20. 8 refs. In Italian.

Pilot trainees were given psychological and physiological tests during their basic flight course. The trainees, on the ground and during their first, seventh and fifteenth flight missions, were required to perform arithmetical computations consisting of a series of successive subtractions, and also to draw a pre-established tracing. During the same flights an electrocardiographic recording was made of the heart rate for some of the trainees. The results of these tests were compared with the results of flight tasks. B.J.

A76-15752 # **Visual acuity in astigmatic subjects and fitness for air force service (Acutezza visiva in soggetti astigmatici ed idoneità al servizio in aeronautica).** P. Rota and C. Terrana. *(NATO, AGARD, Aerospace Medical Panel Specialists Meeting, 31st, Pozzuoli, Italy, Sept. 16-20, 1974.) Rivista di Medicina Aeronautica e Spaziale*, vol. 38, Jan.-Mar. 1975, p. 21-26. In Italian.

Special optotypes, composed of Landolt's rings were used to study the visual acuity of astigmatic subjects in relation to their fitness for air force service. Forty eight males between the ages of 18 and 29 were tested and instances of horizontal, vertical and oblique astigmatism were recorded for both far and near vision. B.J.

A76-15753 # **Excretion of catecholamine in pilot trainees (Escrezione catecolaminica in allievi piloti).** G. Paolucci and G. Blundo. *(NATO, AGARD, Aerospace Medical Panel Specialists Meeting, 31st, Pozzuoli, Italy, Sept. 16-20, 1974.) Rivista di Medicina Aeronautica e Spaziale*, vol. 38, Jan.-Mar. 1975, p. 27-32. In Italian.

The levels of catecholamine present in the urine of sixty pilot trainees during the basic flight course were measured and compared to basic levels of excretion, recorded for the same trainees during periods of inactivity. It is concluded that excretion levels of catecholamine during periods of flight stress can be four times higher than levels during inactivity. B.J.

A76-15754 # **A test method for the rapid and early detection of the most common psychological syndromes among aviation personnel, directly and indirectly associated with air navigation (Un metodo testologico di rilevamento rapido e precoce delle sindromi psichiche più frequenti nel personale aeronautico direttamente o indirettamente preposto alla navigazione aerea).** L. Longo. *(NATO, AGARD, Aerospace Medical Panel Specialists Meeting, 31st, Pozzuoli, Italy, Sept. 16-20, 1974.) Rivista di Medicina Aeronautica e Spaziale*, vol. 38, Jan.-Mar. 1975, p. 33-45. 9 refs. In Italian.

Two groups of subjects, the first group consisting of subjects with psychological syndromes, in particular, depression and anxiety, and the second group, a control group, consisting of ground and flight personnel, were given a psychological test. The test consisted of drawing three dots at random on a sheet of paper, and connecting them to form a figure, whose characteristics were then interpreted. B.J.

A76-15755 # **Ejection-seat related vertebral lesions - Mechanism, diagnosis, consequences and means of prevention. II (Lesioni vertebrali da ejezione con seggiolino catapultabile - Meccanismo, diagnosi, esiti e mezzi di prevenzione. II).** G. Rotondo (Aeronautica Militare, Istituto Medico Legale, Milan, Italy). *Rivista di Medicina Aeronautica e Spaziale*, vol. 38, Jan.-Mar. 1975, p. 62-77. 33 refs. In Italian.

The paper presents a comparative analysis of one hundred cases of ejection-seat escape from jet aircraft between 1953 and 1972 involving military and civilian Italian pilots, with respect to vertebral injuries suffered. Of the 100 cases, there were 11 fatalities, with 47 ejections with the pilots completely uninjured, and 42 with some injury. Among the 15 pilots with single and multiple injuries, there were 23 fractured vertebrae, with predominance of fractures of the dorso-lumbar transition tract. A statistical analysis is presented for the observed cases, taking into account structural and operational differences between the aircraft, and individual physical differences between pilots. B.J.

A76-15756 # **Otorhinolaryngological syndromes in aeronautics (Sindromi otorinolaringoiatriche in aeronautica).** C. Koch (Aeronautica Militare, Servizio di Sanità, Rome, Italy). *Rivista di Medicina Aeronautica e Spaziale*, vol. 38, Jan.-Mar. 1975, p. 100-110. 23 refs. In Italian.

The paper examines the incidence of barotrauma, noise trauma and labyrinthopathy during flight activity. The symptomology of various vestibular disturbances, including those related to dizziness, nystagmus, loss of orientation and equilibrium, is studied. The physiological effects of flight acceleration stresses are investigated, with emphasis on disturbances in the circulatory and nervous systems. Diagnostic methods, preventive measures and therapies are briefly discussed. B.J.

A76-15757 # **Computerized analysis of electrocardiograms as a possibility of cardiological screening in the armed forces (Analisi automatica dell'elettrocardiogramma come possibilità di screening cardiologico nell'ambito militare).** F. Fronzaroli. *Rivista di Medicina Aeronautica e Spaziale*, vol. 38, Jan.-Mar. 1975, p. 111-120. In Italian.

Some of the advantages of computerized analysis of electrocardiograms are discussed. These include a large number of readings in a brief time, an objective diagnosis, long-distance signal transmission, and large-scale epidemological screening. The automated system consists of an electronic unit for recording clinical data on a magnetic tape, a three-channel electrocardiograph, a high-fidelity magnetic recording system, and a device for transmitting signals on ordinary telephone lines. B.J.

A76-15758 # **Effects of supersonic flight on the human organism - Experiences of an air force medical officer (Effetti del volo supersonico sull'organismo umano - Esperienze di un ufficiale medico di aeronautica).** G. Rotondo (Aeronautica Militare, Scuola Militare di Sanità Aeronautica, Rome, Italy). *Rivista di Medicina Aeronautica e Spaziale*, vol. 38, Jan.-Mar. 1975, p. 121-158. 13 refs. In Italian.

A subjective description is given of the physiological effects of supersonic flight on the TF 104 G aircraft. It is submitted that

certain physiopathological effects, such as those due to hypoxic hypoxia, decompression sickness, barometric low pressure, and positive centrifugal accelerations, have been eliminated due to the efficiency of onboard protective equipment and also to the peculiar features and procedures of supersonic flight. B.J.

A76-15759 # **Study on the biodynamic response to wind-blast during ejection - Pathogenetic mechanism, analyses and prevention of lesions due to wind aerodynamic pressure (Studio sulla risposta biodinamica all'urto del vento nelle ejezioni con seggiolino catapultabile - Meccanismo patogenetico, analisi e prevenzione delle lesioni da pressione aerodinamica del vento).** G. Rotondo (Aeronautica Militare, Scuola Militare di Sanità Aeronautica, Rome, Italy). *(NATO, AGARD, Aerospace Medical Panel Specialists Meeting, Toronto, Canada, May 5-9, 1975.) Rivista di Medicina Aeronautica e Spaziale*, vol. 38, Apr.-Sept. 1975, p. 209-234. 30 refs. In Italian.

A76-15760 # **Psychophysical efficiency of specialist personnel in military aviation following prolonged exposure to high-intensity noise (Efficienza psicofisica dopo esposizione prolungata ad intensi rumori in personale specialista dell'aeronautica militare).** C. A. Ramacci (Aeronautica Militare, Centro di Studi e Ricerche di Medicina Aeronautica e Spaziale, Rome, Italy) and P. Rota. *(NATO, AGARD, Aerospace Medical Panel Specialists Meeting, Toronto, Canada, May 5-9, 1975.) Rivista di Medicina Aeronautica e Spaziale*, vol. 38, Apr.-Sept. 1975, p. 235-241. 5 refs. In Italian.

Psychological and psychophysiological tests (Toulouse-Périn attention test, critical flicker fusion, reaction time to visual stimulus) were conducted on 20 military aviation ground crew subjects assigned to aircraft maintenance, motor testing, and flight-line attendance while being exposed to various degrees of noise: continuous exposure to about 120-dB noise for 1 1/2 hr and continuous exposure to 60-80 dB background noise with transient peaks of 90-115 dB for 5 hr. Tests results before and after exposure to noise indicate no statistically significant change in personnel efficiency. S.D.

A76-15761 # **Intellectual and perceptual mental factors (Fattori mentali intellettivo-percettivi).** F. Sparvieri. *Rivista di Medicina Aeronautica e Spaziale*, vol. 38, Apr.-Sept. 1975, p. 280-295. 7 refs. In Italian.

The paper presents results of a series of studies in which a behavioral examination of a group of subjects submitted to the Zullinger test is combined with a factorial analysis. Two different types of mental activity as related to the intellectual and perceptual functions are identified: synthetic-creative and analytic-inhibitory. The practical implications of this theory in aviation are discussed. S.D.

A76-15762 # **Theoretical aspects of psychological selection (Aspetti dottrinari della selezione psicologica).** F. Sparvieri. *Rivista di Medicina Aeronautica e Spaziale*, vol. 38, Apr.-Sept. 1975, p. 296-306. In Italian.

A multiple regression equation is presented as the mathematical expression of the theoretical principle underlying the operations related to the psychological selection of human subjects. Such operations are regarded as practical acts to be concluded with probabilistic judgements on the suitability of certain selectional options used. The proposed multiple regression equation is open due to the possibility of further inclusion of test variables in it. S.D.

A76-15763 # **Protective effect of brain cortex gangliosides on the temporary loss of hearing induced by high-intensity noise in man (Effetto protettivo nell'uomo di gangliosidi di corteccia cerebrale sulla perdita temporanea di udito indotta da rumore ad alta intensità).** G. Maniero and G. A. Molinari (Padova, Università, Padua, Italy). *Rivista di Medicina Aeronautica e Spaziale*, vol. 38, Apr.-Sept. 1975, p. 307-316. 14 refs. In Italian.

Experiments were conducted to find out whether administration of brain cortex gangliosides to normal subjects is capable of reducing the temporary rise in the auditory threshold after exposure to intense noise. It is found that the testees exposed for 30 min to a narrow-band noise about 2 kHz (100 dB) did not exhibit any significant change in their auditory threshold, contrary to the threshold increase observed in the controls. S.D.

STAR ENTRIES

N76-11999* Old Dominion Univ., Norfolk, Va.
HUMAN FACTORS IN GENERAL AVIATION
In its Gen. Aviation and Community Develop. 1975 p 48-55 refs
CSCL 05E

The relation of the pilot to the aircraft in general aviation is considered. The human component is analyzed, along with general aviation facilities. The man-machine interface, and the man-environment interface are discussed. F.O.S.

N76-12635 California Univ., Los Angeles.
EFFECTS OF VERY HIGH PRESSURE ON ORGANIC AND BIOLOGICAL SYSTEMS Ph.D. Thesis
Randall Bertrand Murphy 1975 339 p
Avail: Univ. Microfilms Order No. 75-25201

The influence of high pressure on the structure and reactivity of various simple and complex organic and biological systems was investigated. Anthracene exhibits marked self-reactivity under 50-60 Kilobars from -200 C to +550 C. In comparison with 25 C, the reaction rate has a negative temperature coefficient at -200 C. Products at room temperature and above are complex and are shown, by conventional and chemical ionization mass spectrometry, to be polymeric. At -200 C, the dimer is almost exclusively formed. At 32 C, the rate of self-reaction varies depending on the fragmentation product examined. On the basis of mass spectral and influorescence data, structures are proposed for the polymer. Dissert. Abstr.

N76-12636# Joint Publications Research Service, Arlington, Va.
SPACE BIOLOGY AND AEROSPACE MEDICINE, VOLUME 9, NO. 4, 1975
22 Oct. 1975 160 p refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmicheskaya Med. (USSR), v. 9, no. 4, Jul.-Aug. 1975 154 p
(JPRS-65988) Avail: NTIS HC $6.75

Articles are presented concerning the development of closed ecological systems for man-sustaining life support systems, acceleration tolerance, and effects of hypokinesia. Other topics discussed include: radiation shielding; effect of hypoxia on work performance; enzyme activity under conditions of acceleration stress, vibration, and irradiation; and biotelemetry. For individual titles, see N76-12637 through N76-12660.

N76-12637 Joint Publications Research Service, Arlington, Va.
MATHEMATICAL MODEL OF AN EXPERIMENTAL ECOLOGICAL SYSTEM WITH SPATIALLY SEPARATED COMPONENTS
G. Yu. Riznichenko and A. B. Rubin *In its* Space Biol. and Aerospace Med., Vol. 9, No. 4, 1975 (JPRS-65988) 22 Oct. 1975 p 1-10 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmicheskaya Med. (USSR), v. 9, no. 4, Jul.-Aug. 1975 p 3-9

The cycling of matter and energy in ecological systems is examined. A model of an experimental ecological system consisting of autotrophic and heterotrophic components and a nutrient medium is described. It is shown that the system has a zero stationary state and requires a definite correction for mineral matter to ensure prolonged existence. The lifetime of the system and the level of the correction are determined for the experimental ecological system: lettuce-slugs-nutrient solution. Optimum conditions for the conjugation of trophic components of the system are established. Author

N76-12638 Joint Publications Research Service, Arlington, Va.
MODEL OF AN ECOLOGICAL SYSTEM CLOSED WITH RESPECT TO GAS EXCHANGE AND WITH A PERIODICALLY OPERATING AUTOTROPHIC SYSTEM. 1: STATIONARY STATE CONDITIONS FOR SYSTEM ATMOSPHERE
V. G. Shabelnikov *In* Its Space Biol. and Aerospace Med., Vol. 9, No. 4, 1975 (JPRS-65988) 22 Oct. 1975 p 11-17 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmicheskaya Med. (USSR), v. 9, no. 4, Jul.-Aug. 1975 p 10-13

A semiclosed ecological system consisting of a man and a photosynthetic autotrophic component is described. The conditions required to maintain the stability of the atmosphere are discussed in terms of two alternating modes of functioning of the autotrophic component. These conditions express equal quantities of oxygen and carbon dioxide consumed and produced by the components of the system during any time period, the length of which is the duration of the cycle system. On this basis, equations are derived which help to identify the photosynthetic cultures that can be used as an autotrophic component in a closed man-sustaining life support system. Author

N76-12639 Joint Publications Research Service, Arlington, Va.
DETERMINATION OF THE MECHANICAL PARAMETERS OF THE CUPULO-ENDOLYMPHATIC SYSTEM FROM ITS ANATOMIC CHARACTERISTICS
V. N. Krutko *In* Its Space Biol. and Aerospace Med., Vol. 9, No. 4, 1975 (JPRS-65988) 22 Oct. 1975 p 18-25 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmicheskaya Med. (USSR), v. 9, no. 4, Jul.-Aug. 1975 p 14-19

A model of a semicircular canal is examined in terms of relating the parameters of anatomic construction of the canal to its mechanical characteristics: time constants and sensitivity to angular velocity. The differences in these characteristics in some species of animals are considered. J.M.S.

N76-12640 Joint Publications Research Service, Arlington, Va.
MICROBIOLOGICAL ASPECTS OF OPERATION OF LIFE SUPPORT SYSTEMS ABOARD LONG-OPERATING SPACESHIPS
Yu. G. Nefedov, S. N. Zagloguyev, and A. N. Viktorov *In* Its Space Biol. and Aerospace Med., Vol. 9, No. 4, 1975 (JPRS-65988) 22 Oct. 1975 p 26-32 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmicheskaya Med. (USSR), v. 9, no. 4, Jul.-Aug. 1975 p 19-23

Environmental control systems which use superoxides, silicagels, or synthetic zeolites to purify the air from microorganisms are examined along with various air conditioning systems. It is shown that the efficiency of such systems is in direct dependence on the time of operation. Factors discussed include: relationship of microbial buildup and multiplication in an atmospheric condensate to the possibility of transfer of conditionally pathogenic microorganisms in a spacecraft cabin and reliability of a life support systems in terms of effect of accumulation of microorganisms on its components. Author

N76-12641 Joint Publications Research Service, Arlington, Va.
SANITARY HYGIENIC INVESTIGATION OF THE TOXIC PROPERTIES OF REGENERATED WATER CONTAINING METHYL ALCOHOL
O. F. Ostapenko, V. A. Kryuchkov, A. N. Malkuta, V. G. Litau, and V. I. Solovyev *In* Its Space Biol. and Aerospace Med., Vol. 9, No. 4, 1975 (JPRS-65988) 22 Oct. 1975 p 33-38 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmicheskaya Med. (USSR), v. 9, no. 4, Jul.-Aug. 1975 p 23-26

The biological and physiological effects of prolonged consumption of regenerated water containing methyl alcohol were investigated. After a thirty day period during which white rats

consumed regenerated water no significant changes were observed in the animals. Author

N76-12642 Joint Publications Research Service, Arlington, Va.
DEVELOPMENT OF MEASURES FOR PREVENTING CONTAMINATION OF THE ATMOSPHERE IN ENCLOSED SPACES
V. D. Yablochkin *In* Its Space Biol. and Aerospace Med., Vol. 9, No. 4, 1975 (JPRS-65988) 22 Oct. 1975 p 39-44 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmicheskaya Med. (USSR), v. 9, no. 4, Jul.-Aug. 1975 p 27-30

The kinetics of the emanation of volatile substances from polymers of different function and composition was studied with respect to their natural aging. The emanation rate was exponentially related to the time of sample storage. Six to nine months after polymer fabrication the emanation rate decreased to a minimum. Possible enobling of synthetic materials by means of diffusion stabilization and thermostating was investigated. Practical recommendations are given on how to prevent contamination of the enclosed atmosphere with emanated products of synthetic materials. Author

N76-12643 Joint Publications Research Service, Arlington, Va.
CHANGES IN THE CONTENT OF FREE AMINO ACIDS IN THE ORGANS AND TISSUES OF RATS UNDER HYPOKINETIC CONDITIONS
G. G. Revich, N. P. Rassolova, and V. A. Zakharchenko *In* Its Space Biol. and Aerospace Med., Vol. 9, No. 4, 1975 (JPRS-65988) 22 Oct. 1975 p 45-54 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmicheskaya Med. (USSR), v. 9, no. 4, Jul.-Aug. 1975 p 31-37

Variations in the content of free amino acids in the gastrocnemius muscle, myocardium, and plasma of rats were measured during hypokinesia and post-hypokinesia periods. It was demonstrated that 35 day hypokinesia led to an increase in almost all amino acids in the gastrocnemius muscle and 60 day hypokinesia resulted in a decrease. Similar changes were observed in the myocardium. Variations in the content of free amino acids in the plasma were identified in every experimental stage. Changes in protein metabolism persisted long after exposure of the animals to prolonged hypokinesia. Author

N76-12644 Joint Publications Research Service, Arlington, Va.
EFFECT OF DIFFERENT CONCENTRATIONS OF NITRATE NITROGEN IN MEDIA ON THE AMINO ACID COMPOSITION OF PROTEIN IN CHLORELLA CELLS
Ya. J. Pendzikevic, T. Vilcok, and J. Skipcik *In* Its Space Biol. and Aerospace Med., Vol. 9, No. 4, 9175 (JPRS-65988) 22 Oct. 1975 p 55-58 ref Transl. into ENGLISH from Kosmich. Biol. i Aviakosmicheskaya Med. (USSR), v. 9, no. 4, Jul.-Aug. 1975 p 37-39

The amino acid composition of the proteins of algae cultivated on media with a varying content of nitric acid minerals is investigated. The algae was cultivated in a standard solution with a 100% content of nitrate, in solutions with an increased concentration (150, 200, and 300%) of KN03, and in nutrient solutions not containing any nitrate. Results indicate that the introduction on nitrates as a source of nitrogen for chlorella cells in their synthesis of proteins and amino acids increases the content of phenyl alanine, valine, tyrosine, and histidine.
J.M.S.

N76-12645 Joint Publications Research Service, Arlington, Va.
BIORHYTHMOLOGICAL SCREENING OF COSMONAUTS

S. I. Stepanova *In* Its Space Biol. and Aerospace Med., Vol. 9, No. 4, 1975 (JPRS-65988) 22 Oct. 1975 p 59-68 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmicheskaya Med. (USSR), v. 9, no. 4, Jul.-Aug. 1975 p 40-46

The characteristics of present day and future interplanetary space missions which may influence the stability of the circadian system in the human body are described. The biorhythmological types of humans are discussed in terms of selection of cosmonauts for a given mission. Methods are suggested for the biorhythmological screening of cosmonauts. Author

N76-12646 Joint Publications Research Service, Arlington, Va.
OPTICAL EFFECTS WITH EXPOSURE OF THE EYES TO COSMIC RAYS
Yu. G. Grigoryev and G. G. Demirchoglyan *In* Its Space Biol. and Aerospace Med., Vol. 9, No. 4, 1975 (JPRS-65988) 22 Oct. 1975 p 69-79 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmicheskaya Med. (USSR), v. 9, no. 4, Jul.-Aug. 1975 p 46-53

The observed visual phenomena developing in humans as a result of the impact of heavy ions on the eye are summarized. Possible mechanisms of these effects are discussed. Author

N76-12647 Joint Publications Research Service, Arlington, Va.
EFFECTIVENESS OF A HELIUM OXYGEN GAS MIXTURE DURING TRANSVERSE ACCELERATIONS
Yu. N. Kamenskiy, Ye. B. Shulzhenko, and A. G. Dianov *In* Its Space Biol. and Aerospace Med., Vol. 9, No. 4, 1975 (JPRS-65988) 22 Oct. 1975 p 81-86 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmicheskaya Med. (USSR), v. 9, no. 4, Jul.-Aug. 1975 p 53-58

Healthy male test subjects, in the age group 20-45 years, were exposed to accelerations of +6 g sub x for 1,200 sec and +10 g sub x for 60 sec. Three gradients of centrifuge acceleration were used in the latter case. In every experimental run the test subjects were exposed to accelerations while breathing air or a helium-oxygen mixture. The positive effect of the helium-oxygen atmosphere was seen in an increase in respiration intensity and in an increase in pulmonary ventilation and gas exchange. This is associated with a decline of the aerodynamic resistance to breathing. The positive effect of the helium-oxygen atmosphere was more pronounced during accelerations of +4 to +8 g sub x and depended on the total exposure time. Author

N76-12648 Joint Publications Research Service, Arlington, Va.
EFFECT OF HYPOKINESIA ON THE VESTIBULAR FUNCTION UNDER MODIFIED MICROCLIMATE CONDITIONS

A. I. Vasilyev and S. D. Kumanichkin *In* Its Space Biol. and Aerospace Med., Vol. 9, No. 4, 1975 (JPRS-65988) 22 Oct. 1975 p 87-91 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmicheskaya Med. (USSR), v. 9, no. 4, Jul.-Aug. 1975 p 58-61

The influence of hypokinesia on the state of the vestibular function is studied. Results indicate that hypokinesia causes: a decrease in nystagmic parameters, an increase in autonomic reactions, and a lengthening of illusory sensations. These vestibular changes are attributed to functional changes in higher parts of the central nervous system. Author

N76-12649 Joint Publications Research Service, Arlington, Va.
CHANGES IN ACOUSTICALLY INDUCED CEREBRAL POTENTIALS WHEN BREATHING OXYGEN AT NORMAL AND EXCESS PRESSURE
H. Kammel, I. A. Peimer, and M. L. Modin *In* Its Space Biol. and Aerospace Med., Vol. 9, No. 4, 1975 (JPRS-65988) 22 Oct. 1975 p 92-99 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmicheskaya Med. (USSR), v. 9, no. 4, Jul.-Aug. 1975 p 61-65

Acoustically induced potentials of the human brain were studied when breathing pure oxygen at a normal and positive pressure. Exposure to pure oxygen at normal pressure reduced the amplitude of induced potentials. The after-effect was prolonged due to the influence of an increasing concentration. During an exposure to the air at a positive pressure the reduction of the amplitude was smaller and reached the pretest levels soon as the pressure returned to normal. Induced potentials are a sensitive indicator of the effect of an altered atmosphere on the central nervous system and the sensory system. Author

N76-12650 Joint Publications Research Service, Arlington, Va.
PORTABLE APPARATUS FOR THE TELEMETRIC REGISTRY OF SOME PHYSIOLOGICAL FUNCTIONS DURING NEURO-PSYCHIC STRESS
S. S. Gofman, E. I. Rimskikh, A. I. Turov, and B. A. Men *In* Its Space Biol. and Aerospace Med., Vol. 9, No. 4, 1975 (JPRS-65988) 22 Oct. 1975 p 100-105 refs Transl. into ENGLISH from Kosmick. Biol. i Aviakosmicheskaya Med. (USSR), v. 9, no. 4, Jul.-Aug. 1975 p 65-68

A bioradiotelemetric system (BRTS) which registers a number of physiological indexes represented in the form of an electric signal including the EEG, ECG, electrooculogram (EOG), and electropneumorgram (EPG) was tested. The investigations were carried out on students taking examinations. The possibility of evaluating a number of physiological parameters simultaneously by means of dynamic radiotelemetry was demonstrated. The BRTS makes it possible to evaluate the state of different body systems, their interrelationships, and the degree of stress of established work. J.M.S.

N76-12651 Joint Publications Research Service, Arlington, Va.
MODIFICATION OF THE COLCHICINE METHOD FOR DETERMINING THE DURATION OF THE MITOTIC CYCLE IN HIGHER PLANTS DURING SPACE FLIGHT
R. N. Platonova, V. P. Olkhovenko, and N. V. Solovyeva *In* Its Space Biol. and Aerospace Med., Vol. 9, No. 4, 1975 (JPRS-65988) 22 Oct. 1975 p 106-112 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmicheskaya Med. (USSR), v. 9, no. 4, Jul.-Aug. 1975 p 68-71

The effect of weightlessness on the genetic structure of plant organisms is determined by studying the duration of the mitotic cycle as a whole and its individual phases under conditions of reduced gravity. Methods used include: autoradiographic and colchicine. Results are presented. J.M.S.

N76-12652 Joint Publications Research Service, Arlington, Va.
ANALYSIS OF THE THICKNESS OF SHIELDING OF A RADIATION REFUGE DURING PROLONGED SPACE FLIGHTS
V. Ye. Dudkin, Ye. Ye. Kovalev, A. V. Kolomenskiy, L. N. Smirennyy, and V. A. Sakovich *In* Its Space Biol. and Aerospace Med., Vol. 9, No. 4, 1975 (JPRS-65988) 22 Oct. 1975 p 113-119 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmicheskaya Med. (USSR), v. 9, no. 4, Jul.-Aug. 1975 p 72-74

A method for computing the thickness of shielding of a radiation shelter for different variants of a prolonged space flight is described. The variants considered include flights with a duration of 100-1000 days both during the period of maximum solar activity and during the period of its minimum. The method is based on an evaluation of radiation conditions on space flights, computation of the accumulation of doses of protons during maneuvering of a ship with a low-thrust engine in the earth's radiation belts and at the time of appearance of proton solar flares, and clarification of the degree of attenuation of doses of cosmic radiation in the shielding. Results are presented. Author

N76-12653 Joint Publications Research Service, Arlington, Va.
METHOD FOR COMPUTING THE THICKNESS OF TISSUE IN DETERMINING DEEP DOSES IN A PHANTOM-DUMMY
L. N. Smirennyy and A. V. Khortsev *In* Its Space Biol. and Aerospace Med., Vol. 9, No. 4, 1975 (JPRS-65988) 22 Oct. 1975 p 120-126 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmicheskaya Med. (USSR), v. 9, no. 4, Jul.-Aug. 1975 p 75-78

A method is described for determining the spatial distribution of absorbed radiation doses in the human body. Factors considered include: the geometry of the body and the interaction between radiation and the tissue. The method computes tissue thickness relative to a selected point of the body using coordinates of points on the body surface. The distribution of tissue thickness at any point is determined along with the dose intensity at that point. J.M.S.

N76-12654 Joint Publications Research Service, Arlington, Va.
TOLERANCE OF BATS TO PROLONGED LONGITUDINAL GRAVITATIONAL OVERLOADS
E. Sh. Ayrapetyants, V. N. Zvorykin, and B. M. Savin *In* Its Space Biol. and Aerospace Med., Vol. 9, No. 9, 1975 (JPRS-65988) 22 Oct. 1975 p 127-129 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmicheskaya Med. (USSR), v. 9, no. 4, Jul.-Aug. 1975 p 79-80

The effect of gravitational forces on several species of bats was investigated. The bats were subjected to acceleration on a rod centrifuge with a radius of 2 m. It was demonstrated that bats are capable of tolerating gravitational overloads, including 70 and 120 g, for a period of 15 seconds. The high tolerance of bats to prolonged longitudinal accelerations and the high reliability of spatial analysis by means of ultrasonic ranging is attributed to the ecological peculiarities of bats. J.M.S.

N76-12655 Joint Publications Research Service, Arlington, Va.
EFFECT OF VIBRATION, ACCELERATION AND ACUTE IRRADIATION IN A DOSE OF 250 R ON THE LOCALIZATION AND ACTIVITY OF SOME LIVER ENZYMES IN SEXUALLY MATURE RABBITS
R. I. Yuy, V. I. Denisov, and G. V. Fedotovskikh *In* Its Space Biol. and Aerospace Med., Vol. 9, No. 4, 1975 (JPRS-65988) 22 Oct. 1975 p 130-133 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmicheskaya Med. (USSR), v. 9, no. 4, Jul.-Aug. 1975 p 80-81

Liver enzymes in rabbits were exposed to a combined dosage of vibration, acceleration, and irradiation. Changes were observed in the activity and localization of all the enzymes studied. J.M.S.

N76-12656 Joint Publications Research Service, Arlington, Va.
EQUIVALENCE OF THE EFFECT ON RECEPTORS OF THE SEMICIRCULAR CANALS FROM TURNING OF THE HEAD IN A ROTATING SYSTEM TO SOME STOP STIMULUS
I. Yu. Sarkisov *In* Its Space Biol. and Aerospace Med., Vol. 9, No. 4, 1975 (JPRS-65988) 22 Jan. 1975 p 134-136 Transl. into ENGLISH from Kosmich. Biol. i Aviakosmicheskaya Med. (USSR), v. 9, no. 4, Jul.-Aug. 1975 p 81-83

After application of acceleration stress the cupulae of the semicircular canals are deflected and slowly rotate into a position of equilibrium, causing illusions and nystagmus. Stop stimuli are used to study the functioning of the semicircular canals. It is demonstrated how an adequate effect on the receptors of the semicircular canals, occuring during active rotation in a rotating system is replaced by a simple passive rotation with subsequent stopping (a stop stimulus). Author

N76-12657 Joint Publications Research Service, Arlington, Va.
CHANGE IN WORK PERFORMANCE IN THE HIGH MOUNTAINS (PSYCHOPHYSIOLOGICAL INVESTIGATION)
A. A. Aydaraliyev and T. Yu. Tashmatov *In* Its Space Biol. and Aerospace Med., Vol. 9, No. 4, 1975 (JPRS-65988) 22 Oct. 1975 p 137-139 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmicheskaya Med. (USSR), v. 9, no. 4, Jul.-Aug. 1975 p 83-84

The influence of hypoxia on pilot performance in tracking activity was investigated. The method and results are presented and discussed. J.M.S.

N76-12658 Joint Publications Research Service, Arlington, Va.
STUDY OF THE BIOELECTRIC ACTIVITY OF THE MYOCARDIUM DURING A PASSIVE ORTHOSTATIC TEST
T. V. Benevolenskaya *In* Its Space Biol. and Aerospace Med., Vol. 9, No. 4, 1975 (JPRS-65988) 22 Oct. 1975 p 140-145 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmicheskaya Med. (USSR), v. 9, no. 4, Jul.-Aug. 1975 p 84-87

Changes in arterial pressure and pulse are examined during passive and active orthostatic tests. The state of the myocardium

during orthostatic tests is studied in order to formulate criteria for tolerance of a passive orthostatic test on the basis of ECG parameters. Results are discussed. J.M.S.

N76-12659 Joint Publications Research Service, Arlington, Va.
POSSIBILITY OF REPRODUCING THE ENERGY COST OF DIFFERENT OPERATIONS IN MANUAL CONTROL OF A SPACECRAFT
V. M. Baranov, M. A. Vytchikova, R. V. Komotskiy, and M. M. Skvortsov *In* Its Space Biol. and Aerospace Med., Vol. 9, No. 4, 1975 (JPRS-65988) 22 Oct. 1975 p 146-150 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmicheskaya Med. (USSR), v. 9, no. 4, Jul.-Aug. 1975 p 87-89

The energy costs of various operations involved in manual control of a spacecraft are determined by means of a tracking apparatus used to simulate the functional activity of a cosmonaut-operator. The method and results are described. J.M.S.

N76-12660 Joint Publications Research Service, Arlington, Va.
PRELIMINARY EVALUATION OF THE POSSIBILITY OF USING LAND MOLLUSKS AS A COMPONENT IN CLOSED ECOLOGICAL SYSTEMS
M. S. Burenkov and A. L. Agre *In* Its Space Biol. and Aerospace Med., Vol. 9, No. 4, 1975 (JPRS-65988) 22 Oct. 1975 p 151-154 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmicheskaya Med. (USSR), v. 9, no. 4, Jul.-Aug. 1975 p 90-92

Life support systems based on the regeneration of matter in a closed biological cycle are considered. The use of land mollusks in the biological cycle of closed systems is evaluated. J.M.S.

N76-12661*# Scientific Translation Service, Santa Barbara, Calif.
THE EFFECT OF ROSTROMEDIAL HYPOTHALAMUS COAGULATION ON THE O2 UPTAKE, RECTAL TEMPERATURE, HEAT TRANSFER, BLOOD SUGAR, MUSCLE AND LIVER GLYCOGEN AS WELL AS ON CHEMICAL THERMOGENESIS IN JUVENILE ALBINO RATS
P. Bartsch, H. Choinowski, and G. Lindh Washington NASA Nov. 1975 17 p refs Transl. into ENGLISH from Acta Biol. Med. Germ. (West Ger.), v. 24, 1970 p 263-275
(Contract NASw-2791)
(NASA-TT-F-16685) Avail: NTIS HC $3.50 CSCL 06C

Immediate, indirect, and remote consequences of a bilateral electrolytic coagulation of the area pracoptica medialis were investigated. Oxygen uptake, body temperature, heat transfer, blood sugar levels, liver and muscle glycogen were studied at a constant ambient temperature of 32 C in three major groups of juvenile albino rats. A model of thermogenetic metabolism at a constant cooling speed was also used. The results were compared with those from experimental animals coagulated at a different site. Author

N76-12662# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.
CARDIOPHYSIOLOGICAL STUDIES WITH STRESSED ANIMALS Final Report
Robert I. Drew and George J. Taylor Dec. 1974 19 p refs (AF Proj. 6302)
(AD-A011858; AMRL-TR-74-125-Paper-8) Avail: NTIS CSCL 06/20

The report presents data that show trifluoro-chloromethane (F-11) is more toxic to cardiomyopathic hamsters than to random-bred hamsters, and that the toxicity is qualitatively different as well. It was also shown in another species that the arrhymic potential of F-11 is increased by hypoxia and the arrhythmias observed are not the result of hypoxia alone. The data from these animal studies are not directly applicable to humans. Genetic cardiomyopathy is not presented as a model of human heart disease or even human cardiomyopathy. The acute hypoxia induced in rabbits is not representative of the acute hypoxic state of the patient with diseases such as asthma or respiratory failure. These data show only that animals with depressed physiologic reserve were more sensitive to F-11 than normal animals. GRA

N76-12663# School of Aerospace Medicine, Brooks AFB, Tex.
PRINCIPLES OF BIODYNAMICS. VOLUME 2: EXPERIMENTAL PROCEDURES IN GRAVITATIONAL BIOLOGY
Clarence F. Kelly and Arthur M. Smith Nov. 1974 52 p refs (AD-A012099; SAM-Review-9-74; SAM-TR-74-45) Avail: NTIS CSCL 06/19

Gravitational-biology experimental procedures depend upon limitations of field effect (e.g., buoyancy or recumbency) or modifications of field strength with inertial forces (e.g., earth-orbital vehicles or centrifuges). For protracted experimentation on earth, investigators faced many variables for constructing and operating animal-centrifugation devices, and a few critical requirements for safety and reliability. These are reviewed to benefit investigators contemplating research in gravitational biology. GRA

N76-12664# Federation of American Societies for Experimental Biology, Bethesda, Md. Life Sciences Research Office.
COMPUTER APPLICATIONS IN THE BIOLOGICAL SCIENCES
Kenneth D. Fisher, C. Jelleff Carr, and John M. Talbot 1975 27 p refs
(Contract F44620-74-C-0077; ARPA Order 2808; AF Proj. 6813)
(AD-A012589; AFOSR-75-0951TR) Avail: NTIS CSCL 05/2

The computer sciences have had a major impact on research and development in the physical sciences and engineering over the past several decades. Their influence on biological research has developed less rapidly. Computer sciences have assumed a more important role in biological and medical research as hardware has become more sophisticated, more widely available, and as its capabilities have been appreciated. The applicability of computers to many facets of biological research is on the threshold of further advances because these applications appear to be maximally efficient and useful at minimized costs. However, monetary constraints over the next several years may delay the extent to which further applications are pursued. GRA

N76-12665 University of South Florida, Tampa.
ELECTROCARDIOGRAM VIA A LIQUID MEDIA: INSTRUMENTATION AND SIGNAL PROCESSING Ph.D. Thesis
Subhash Chander Kwatra 1975 158 p
Avail: Univ. Microfilms Order No. 75-24030

A new method for obtaining the human electrocardiogram is investigated. The proposed technique uses a composite conductive media formed by the patient's body and the external liquids media such as bathwater in a bathtub. Its implementation was carried out in the biomedical systems laboratory. The emphasis of the work is on the development of the associated instrumentation and digital and analog signal processing procedures; and on field theoretic studies. In-depth study of the frequency characteristics of the liquid media, its interface with the sensing electrodes, and the electronic instrumentation system was also carried out. Dissert. Abstr.

N76-12666 Northern Colorado Univ., Greeley.
BLOOD LACTATE DURING INTERMITTENT AND CONTINUOUS EXERCISES Ph.D. Thesis
Anan Attachoo 1975 84 p
Avail: Univ. Microfilms Order No. 75-23303

The effects of intermittent and continuous exercise upon lactate concentration in the blood are examined. Results are: (1) At continuous exercise of 85 per cent MaxVO2 for ten minutes, lactate was produced above the resting level. (2) The means of blood lactate of all three intermittent exercise protocols were significantly above the resting level. (3) There were no statistically significant differences between the accumulated blood lactate of 15 sec.work-15 sec.rest and that of 30 sec.work-30 sec.rest. (4) Compared to the MaxVO2 lactate, the accumulation of blood lactate did not appear to be an exhaustion factor in intermittent exercises. (5) The rate of lactate production was dependent upon the intensity and duration of exercises. (6) The measured blood

lactate of the continuous exercise groups and that of intermittent exercise groups were independent. Dissert. Abstr.

N76-12667 Utah Univ., Salt Lake City.
TORQUES EXERTED BY ROTATIONS OF THE LOWER EXTREMITY Ph.D. Thesis
George Roman Twardokens 1975 138 p
Avail: Univ. Microfilms Order No. 75-23546

The ratio of medial torque to lateral torque in attempted rotations of the lower right extremity in young males was investigated. In the apparatus designed and calibrated, tension exerted by the subject was resisted by the piston in the hydraulic cylinder, sensed by fluid transducers, and the signal fed into an x-y plotter. Anthropometric measurements were taken on limb parameters, immobilization was arranged to isolate the tested joints from unwanted body movements, and maximum voluntary torques were recorded from the knee and hip at intervals throughout the joint range. Torque ratio observed in vivo may favor medial or lateral rotation; and these trends may be predicted from torques recorded in the anatomical position (0 deg) of the segment tested. Magnitudes of torques were dependent upon limb position in the transverse and/or sagittal plane, but uninfluenced by the cadence of rotator muscle contraction. Limb position in which the tested muscles were elongated recorded the largest foot-pound scores. Dissert. Abstr.

N76-12668*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
BIOMEDICAL RESULTS OF APOLLO
Richard S. Johnston, ed., Lawrence F. Dietlein, ed., and Charles A. Berry, ed. Washington 1975 592 p refs Prepared in cooperation with BioTechnology, Inc. Original contains color illustrations
(Contract NASw-2630)
(NASA-SP-368; LC-75-600030) Avail: NTIS MF $2.25; SOD HC $13.15 CSCL 06S

The biomedical program developed for Apollo is described in detail. The findings are listed of those investigations which are conducted to assess the effects of space flight on man's physiological and functional capacities, and significant medical events in Apollo are documented. Topics discussed include crew health and inflight monitoring, preflight and postflight medical testing, inflight experiments, quarantine, and life support systems.

N76-12669* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
CLINICAL ASPECTS OF CREW HEALTH
W. Royce Hawkins and John F. Zieglschmid *In its* Biomedical Results of Apollo 1975 p 43-81

CSCL 06E

Medical procedures and findings for Apollo astronauts in the preflight, inflight, and postflight phases of the Apollo missions are described in detail. Preflight medical examinations, inflight monitoring and medications, crew illnesses, and clinical findings are summarized. M.J.S.

N76-12670* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
MICROBIOLOGICAL INVESTIGATIONS
James K. Ferguson, Gerald R. Taylor, and Bernard J. Mieszkuc *In its* Biomedical Results of Apollo Jul. 1975 p 83-103

CSCL 06M

The crew microbiology program was conducted to evaluate lunar contamination, to detect potentially pathogenic microorganisms, to identify medically important microorganisms recovered from ill crewmen, to aid in diagnosis and treatment, and to collect microbiological data that would aid in elucidating the response of the crew microbial autoflora to the space flight environment and in evaluating the resultant effect on the crewmember. Microbiological sampling of selected sites in the command module was initiated in support of the quarantine program. During lunar quarantine missions, microbial screening was accomplished for all support personnel to be isolated with the returning crewman. Virology support for the Apollo project consisted of characterization of the viral and mycoplasma flora of the crewmembers and performance of viral serology for crewmembers, crew contacts, and key mission personnel. Procedures and results are discussed in detail. Author

N76-12671* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
RADIATION PROTECTION AND INSTRUMENTATION
J. Vernon Bailey *In its* Biomedical Results of Apollo Jul. 1975 p 105-113 refs
CSCL 06R

Radiation was found not to be an operational problem during the Apollo program. Doses received by the crewmen of Apollo missions 7 through 17 were small because no major solar-particle events occurred during those missions. One small event was detected by a radiation sensor outside the Apollo 12 spacecraft, but no increase in radiation dose to the crewmen inside the spacecraft was detected. Radiation protection for the Apollo program was focused on both the peculiarities of the natural space radiation environment and the increased prevalence of manmade radiation sources on the ground and onboard the spacecraft. Radiation-exposure risks to crewmen were assessed and balanced against mission gain to determine mission constraints. Operational radiation evaluation required specially designed radiation detection systems onboard the spacecraft in addition to the use of satellite data, solar observatory support, and other liaison. Control and management of radioactive sources and radiation-generating equipment was important in minimizing radiation exposure of ground-support personnel, researchers, and the Apollo flight and backup crewmen. Author

N76-12672* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
METABOLISM AND HEAT DISSIPATION DURING APOLLO EVA PERIODS
J. M. Waligora and D. J. Horrigan *In its* Biomedical Results of Apollo Jul. 1975 p 115-128 refs

CSCL 06P

The extravehicular activity life support equipment, suit temperature control, metabolic rate measurement methods, and energy production are discussed. The Apollo crewmen were able to perform planned extravehicular activities and to extend them to the maximum time allowable without medical problems. The metabolic rates experienced during the lunar surface extravehicular activities were lower than conservative premission estimates. A manually controlled liquid cooling garment was effectively used to minimize fatigue and water loss from sweating during lunar surface extravehicular activities. Gas cooling was adequate during the short zero-g extravehicular activities performed from the command module. The prediction of EVA workloads became more reliable as inflight data was accumulated. The prediction of the average metabolic cost of an EVA was more reliable than the cost of an individual short-term task. Author

N76-12673* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
ENVIRONMENTAL FACTORS
E. L. Michel, J. M. Waligora, D. J. Horrigan, and W. H. Shumate *In its* Biomedical Results of Apollo Jul. 1975 p 129-139 refs
CSCL 06K

The selection of an Apollo spacecraft atmosphere was based on the establishment of an acceptable range of atmospheric composition and pressure, the establishment of acceptable carbon dioxide levels, thermal comfort criteria, and acceleration and impact limits. The prime design requirements in a spacecraft system are minimum weight, volume, power usage, reliability, ease of maintenance, environmental compatibility, integration with other systems, and crew compatibility. The selection considerations are reviewed. M.J.S.

N76-12674* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
FLIGHT CREW HEALTH STABILIZATION PROGRAM
Bennie C. Wooley and Gary W. McCollum *In its* Biomedical

Results of Apollo Jul. 1975 p 141-149 refs

CSCL 06I

The flight crew health stabilization program was developed to minimize or eliminate the possibility of adverse alterations in the health of flight crews during immediate preflight, flight, and postflight periods. The elements of the program, which include clinical medicine, immunology, exposure prevention, and epidemiological surveillance, are discussed briefly. No crewmember illness was reported for the missions for which the program was in effect. M.J.S.

N76-12675* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
THE ROLE OF TOXICOLOGY IN THE APOLLO SPACE PROGRAM
Wayland J. Rippstein, Jr. *In its* Biomedical Results of Apollo Jul. 1975 p 151-159 ref

CSCL 06T

Some of the major considerations are presented which governed the formation and application of the toxicology program employed in support of the Apollo program. The overriding concern of the program was the safety of crews exposed to trace contaminant gases for extended periods of time. The materials screening program employed, in conjunction with a well designed spacecraft environmental control system, helped to attain the goals set forth for the Apollo program. The knowledge gained from working with the toxicity problems and the identification of compounds in the space cabin atmosphere are of importance for continued efforts in manned space flight. Tabular data of spacecraft contaminants are presented. Author

N76-12676* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
ENDOCRINE, ELECTROLYTE, AND FLUID VOLUME CHANGES ASSOCIATED WITH APOLLO MISSIONS
Carolyn S. Leach, W. Carter Alexander, and P. C. Johnson (Baylor Coll. of Medicine) *In its* Biomedical Results of Apollo Jul. 1975 p 163-184 refs
CSCL 06S

The endocrine and metabolic results obtained before and after the Apollo missions and the results of the limited in-flight sampling are summarized and discussed. The studies were designed to evaluate the biochemical changes in the returning Apollo crewmembers, and the areas studied included balance of fluids and electrolytes, regulation of calcium metabolism, adaptation to the environment, and regulation of metabolic processes. Author

N76-12677* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
CLINICAL BIOCHEMISTRY
W. C. Alexander, Carolyn S. Leach, and Craig L. Fischer *In its* Biomedical Results of Apollo Jul. 1975 p 185-196 refs

CSCL 06A

The objectives of the biochemical studies conducted for the Apollo program were (1) to provide routine laboratory data for assessment of preflight crew physical status and for postflight comparisons; (2) to detect clinical or pathological abnormalities which might have required remedial action preflight; (3) to discover as early as possible any infectious disease process during the postflight quarantine periods following certain missions; and (4) to obtain fundamental medical knowledge relative to man's adjustment to and return from the space flight environment. The accumulated data presented suggest that these requirements were met by the program described. All changes ascribed to the space flight environment were subtle, whereas clinically significant changes were consistent with infrequent illnesses unrelated to the space flight exposure. Author

N76-12678* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
HEMATOLOGY AND IMMUNOLOGY STUDIES
Stephen L. Kimzey, Craig L. Fischer, Philip C. Johnson (Baylor Coll. of Medicine), Stephen E. Ritzmann (Texas Univ.), and Charles E. Mengel (Missouri Univ.) *In its* Biomedical Results of Apollo Jul. 1975 p 197-226 refs

CSCL 06E

The hematology and immunology program conducted in support of the Apollo missions was designed to acquire specific laboratory data relative to the assessment of the health status of the astronauts prior to their commitment to space flight. A second objective was to detect and identify any alterations in the normal functions of the immunohematologic systems which could be attributed to space flight exposure, and to evaluate the significance of these changes relative to man's continuing participation in space flight missions. Specific changes observed during the Gemini Program formed the basis for the major portion of the hematology-immunology test schedule. Additional measurements were included when their contribution to the overall interpretation of the flight data base became apparent. Author

N76-12679* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
APOLLO FLIGHT CREW CARDIOVASCULAR EVALUATIONS
G. W. Hoffler and Robert L. Johnson *In its* Biomedical Results of Apollo Jul. 1975 p 227-264 refs

CSCL 06S

The results of the lower body negative pressure (LBNP) and passive stand tests are presented, and the efficacy of the experimental antihypotensive garments is evaluated. Results of the tests are presented in tabular form. Postflight orthostatic evaluations during the Apollo program indicate that reduction in orthostatic tolerance is a consequence of space flight exposure. Heart rate, the most reliable index, was increased, while systolic and pulse pressures were decreased during immediate postflight evaluations using lower body negative pressure and passive standing as the orthostatic stress. Elevation in resting heart rate was a less frequent finding. There was considerable variability in the magnitude of these changes between individual crewmembers and in the persistence of the changes over subsequent postflight evaluations. Postflight changes in leg volume during LBNP were equal to or less than those seen during preflight baseline evaluations. Body weight, resting calf girth, supine leg volume, and cardiothoracic ratios were all diminished immediately postflight, and return to preflight values was not complete within the postflight testing time frame. Author

N76-12680* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
EXERCISE RESPONSE
J. A. Rummel, C. F. Sawin, and E. L. Michel *In its* Biomedical Results of Apollo Jul. 1975 p 265-275 refs

CSCL 06P

The bicycle ergometer and a graded stress protocol were used to conduct exercise stress tests for the Apollo project. The graded exercise tests permitted a progressive evaluation of physiological control system response and provided a better understanding of safe stress limits; heart rate was used for determining stress levels. During each test, workload, heart rate, blood pressure, and respiratory gas exchange (oxygen consumption, carbon dioxide production, and minute volume) measurements were made. The results are presented and discussed. M.J.S.

N76-12681* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
NUTRITIONAL STUDIES
Paul C. Rambaut, Malcolm C. Smith, Jr., and Harry O. Wheeler *In its* Biomedical Results of Apollo Jul. 1975 p 277-302 refs
CSCL 06H

Detailed metabolic studies were conducted of the Apollo 16 and Apollo 17 flight crews, and the results are presented in tabular form. Intake and absorption data are also included. Apollo

nutrient intakes were found to be characteristically hypocaloric. Estimates of body composition changes from metabolic balance data, from preflight and postflight weights and volumes, and from total body water and potassium provide no evidence for diminished caloric requirements during a flight. As observed during the Gemini Program and during periods of bed rest, measurements of bone density and metabolic balance confirm a tendency toward loss of skeletal tissue in weightlessness. No evidence exists that any inflight metabolic anomaly, including hypokalemia, was induced by marginal or deficient nutrient intakes. In general, the Apollo crewmen were well nourished and exhibited normal gastroenterological functions, although appetite was somewhat diminished and the organoleptic response to food was somewhat modified during flight. Author

N76-12682* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
SKELETAL RESPONSE
Paul C. Rambaut, Malcolm C. Smith, Jr., Pauline Beery Mack (Texas Women's Univ.), and John M. Vogel (US Public Health Service Hospital, San Francisco) *In its* Biomedical Results of Apollo Jul. 1975 p 303-322 refs

CSCL 06P

The effect of weightlessness on bone mineral content during prolonged space flight was investigated. The mineral content changes which occurred during Apollo 14, 15, and 16 as measured by photon absorptiometry techniques are presented and compared. Bed rest served as an experimental model to assess the bone mineral changes, and to determine what remedial measures might be used to stem the tide of bone mineral loss. It is concluded that loss of mineral from bone due to the state of weightlessness is comparable to that observed in bed rest subjects. J.M.S.

N76-12683* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
APOLLO FLIGHT CREW VESTIBULAR ASSESSMENT
J. L. Homick and Earl F. Miller, II (NAMRL) *In its* Biomedical Results of Apollo Jul. 1975 p 323-340 refs

CSCL 06P

Vestibular function in the weightless state of space flight is examined. Due to the lack of a systematic program to assess quantitatively the effects of space flight on crew vestibular function the analysis is based on qualitative information derived from motion sickness histories and subjective reporting by individual astronauts on the type and magnitude of vestibular disturbances experienced during and following their missions. It is concluded that the increased mobility afforded by the larger volume of the Apollo CM/LM resulted in a higher incidence of vestibular disturbances in the Apollo Program and that it is difficult to predict the likelihood of inflight vestibular problems. Quantitative examination of the effects of weightlessness on the vestibular function is recommended. J.M.S.

N76-12684* Johann-Wolfgang-Goethe-Universitat, Frankfurt am Main (West Germany).
BIOSTACK: A STUDY OF THE BIOLOGICAL EFFECTS ON HZE GALACTIC COSMIC RADIATION
Horst Buecker *In* NASA. Johnson Space Center Biomedical Results of Apollo Jul. 1975 p 343-354 refs

CSCL 06R

The Biostack experiment designed to study the effect of individual heavy nuclei of the cosmic radiation environment upon biological systems during actual space flight is described. In each Biostack, several thousand biological objects were hit by an HZE particle. The response of the biological objects was studied. Results are discussed in terms of sensitivity to the hit. J.M.S.

N76-12685* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
APOLLO LIGHT FLASH INVESTIGATIONS
W. Zachary Osborne (Houston Univ.), Lawrence S. Pinsky (Houston Univ.), and J. Vernon Bailey *In its* Biomedical Results of Apollo Jul. 1975 p 355-365 refs

CSCL 06R

The visual phenomenon of light flashes resulting from high energy, heavy cosmic rays penetrating the command module structure and crewmembers' eyes is investigated. Light flash events observed during dedicated sessions on Apollo 15, 16, 17 are described along with a Monte Carlo simulation of the exposure of an astronaut to cosmic radiation during a mission. Results of the Apollo Light Flash Moving Emulsion Detector experiment developed for Apollo 16 and 17 to obtain a direct record of incident cosmic ray particles are correlated with crewmembers' reports of light flashes. J.M.S.

N76-12686* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
THE APOLLO 16 MICROBIAL RESPONSE TO SPACE ENVIRONMENT EXPERIMENT
Gerald R. Taylor *In its* Biomedical Results of Apollo Jul. 1975 p 367-380 refs
CSCL 06M

The effect was evaluated of a particular space flight on the survival rate of nine different species. Although a reasonable variety of organisms (viruses, yeasts, filamentous fungi, bacteria, and an invertebrate) were tested under several different conditions, no statistically valid differences could be detected in the survival of flight samples when compared to corresponding ground-based controls. In general, these evaluations were based on multiple observations of from ten to thirty replicates of up to one million cells each. While the results conflict with those of certain other space flight investigations, it is observed that the conditions of a particular space flight cannot be exactly duplicated, and therefore results from different flights are not directly comparable. Author

N76-12687* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
THE APOLLO 17 POCKET MOUSE EXPERIMENT (BIOCORE)
Webb Haymaker, Bonne C. Look, Eugene V. Benton (San Francisco Univ.), and Richard C. Simmonds *In its* Biomedical Results of Apollo Jul. 1975 p 381-403

CSCL 06R

Results are presented of the Biocore experiment which attempted to assess the degree to which exposure to cosmic ray particle radiation might present a risk to astronauts. Pocket mice, with plastic dosimeters implanted beneath the scalp were flown in a sealed canister. The objective was to determine whether microscopically visible lesions attributable to particle radiation, could be found in brain, eye, and other tissues in these animals. The need for further study is demonstrated. J.M.S.

N76-12688* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
THE LUNAR QUARANTINE PROGRAM
Richard S. Johnston, John A. Mason, Bennie C. Wooley, Gary W. McCollum, and Bernard J. Mieszkuc *In its* Biomedical Results of Apollo Jul. 1974 p 407-424

CSCL 06E

The lunar quarantine program was designed to ensure that return of lunar material represented no threat to the public health, to agriculture, or to other living resources. It established definitely that no life exists on the moon. The crews of the three lunar quarantine missions, Apollo 11, 12, and 14, experienced no health problems as a result of their exposure to lunar samples. Plants and animals also showed no adverse effects. Stringent quarantine was terminated after Apollo 14, but lunar samples continued to be protected to guarantee that scientists would receive uncontaminated materials for study. Author

N76-12689* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
QUARANTINE TESTING AND BIOCHARACTERIZATION OF LUNAR MATERIALS

Gerald R. Taylor, Bernard J. Mieszkuc, Richard C. Simmonds (US Air Force), and Charles H. Walkinshaw (Dept. of Agriculture) *In its* Biomedical Results of Apollo Jul. 1975 p 425-434 refs

CSCL 06M

Quarantine testing was conducted to ensure the safety of all life on earth. The plants and animals which were exposed to lunar material were carefully observed for prolonged periods to determine if any mutation or changes in growing characteristics and behavior occurred. The quarantine testing was terminated after the Apollo 14 flight when it became apparent that previously returned lunar material contained no potentially harmful agents. Further biological experimentation with the lunar material was conducted to determine its chemical, physical, and nutritional qualities. Author

N76-12690* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

APOLLO FOOD TECHNOLOGY

Malcolm C. Smith, Jr., N. D. Heidelbaugh, Paul C. Rambaut, R. M. Rapp, Harry O. Wheeler, C. S. Huber (Technology, Inc.), and C. T. Bourland (Technology, Inc.) *In its* Biomedical Results of Apollo Jul. 1975 p 437-468 refs

CSCL 06H

Large improvements and advances in space food systems achieved during the Apollo food program are discussed. Modifications of the Apollo food system were directed primarily toward improving delivery of adequate nutrition to the astronaut. Individual food items and flight menus were modified as nutritional countermeasures to the effects of weightlessness. Unique food items were developed, including some that provided nutritional completeness, high acceptability, and ready-to-eat, shelf-stable convenience. Specialized food packages were also developed. The Apollo program experience clearly showed that future space food systems will require well-directed efforts to achieve the optimum potential of food systems in support of the physiological and psychological well-being of astronauts and crews. Author

N76-12691* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

WASTE MANAGEMENT SYSTEM

Richard L. Sauer and George K. Jorgensen (Boeing Co.) *In its* Biomedical Results of Apollo Jul. 1975 p 469-484 refs

CSCL 06I

The function of the waste management system was to control the disposition of solid and liquid wastes and waste stowage gases. The waste management system consisting of a urine subsystem and a fecal subsystem is described in detail and its overall performance is evaluated. Recommendations for improvement are given. J.M.S.

N76-12692* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

BIOINSTRUMENTATION

Stanley M. Luczkowski *In its* Biomedical Results of Apollo Jul. 1975 p 485-493

CSCL 06B

The Apollo bioinstrumentation system (BIS) and related hardware is described. The BIS requirements evolved as a continuation and refinement of medical monitoring systems utilized throughout the Mercury and Gemini programs. The BIS provided physiological data to ground-based medical personnel for operational inflight safety monitoring, for inflight medical experiments; and for ground-based operations safety monitoring. The overall performance of the BIS is evaluated. J.M.S.

N76-12693* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

POTABLE WATER SUPPLY

Richard L. Sauer and David J. Calley *In its* Biomedical Results of Apollo Jul. 1975 p 495-515 refs

CSCL 06K

The history and evolution of the Apollo potable water system is reviewed. Its operation in the space environment and in the spacecraft is described. Its performance is evaluated. The Apollo potable water system satisfied the dual purpose of providing metabolic water for the crewmen and water for spacecraft cooling. J.M.S.

N76-12694* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

APOLLO COMMAND AND SERVICE MODULE AND LUNAR MODULE ENVIRONMENTAL CONTROL SYSTEMS

James C. Brady, Donald F. Hughes, Frank H. Samonski, Jr., Roger W. Young (Boeing Aerospace Co.), and David M. Browne (Boeing Aerospace Co.) *In its* Biomedical Results of Apollo Jul. 1975 p 517-543 refs

CSCL 06K

The environmental control systems and system requirements of the Apollo command service module and the lunar module are described. The overall performance of both systems during the Apollo program is discussed. Other topics covered include: dust control, EVA provisions, Apollo 13 emergency, component redundancy, modular construction, and subatmospheric design. J.M.S.

N76-12695* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

EXTRAVEHICULAR MOBILITY UNIT

Maurice A. Carson, Michael N. Rouen, Charles C. Lutz, and James W. McBarron, II *In its* Biomedical Results of Apollo Jul. 1975 p 545-569

CSCL 06K

The Apollo extravehicular mobility unit (EMU) consisted of a highly mobile, anthropomorphic pressure vessel and a portable life support system. The EMU used for the first lunar landing is described along with the changes made in the EMU design during the program to incorporate the results of experience and to provide new capabilities. The performance of the EMU is discussed. J.M.S.

N76-12696*# Trustees of Health and Hospitals of the City of Boston, Inc., Mass.

ENGINEERING STUDIES OF VECTORCARDIOGRAPHS IN BLOOD PRESSURE MEASURING SYSTEMS Final Report, 10 Mar. 1971 - 31 Jul. 1975

R. G. Mark 20 Oct. 1975 29 p refs

(Contract NAS9-11609)

(NASA-CR-144555) Avail: NTIS HC $4.00 CSCL 06B

The following projects involving cardiovascular instrumentation were conducted: (1) the development and fabrication of a three-dimensional display measurement system for vectorcardiograms, (2) the development and fabrication of a cardiovascular monitoring system to noninvasively monitor beat-by-beat the blood pressure and heart rate using aortic pulse wave velocity, (3) the development of software for an interactive system to analyze systolic time interval data, and (4) the development of microprocessor-based physiologic instrumentation, focussing initially on EKG rhythm analysis. Brief descriptions of these projects were given. Author

N76-12697*# Trustees of Health and Hospitals of the City of Boston, Inc., Mass.

ENGINEERING STUDIES OF VECTORCARDIOGRAPHS IN BLOOD PRESSURE MEASURING SYSTEMS, APPENDIX 2 Final Report

R. G. Mark 20 Oct. 1975 299 p refs

(Contract NAS9-11609)

(NASA-CR-144557) Avail: NTIS HC $9.25 CSCL 06B

The development of a cardiovascular monitoring system to noninvasively monitor the blood pressure and heart rate using pulse wave velocity was described. The following topics were covered: (1) pulse wave velocity as a measure of arterial blood pressure, (2) diastolic blood pressure and pulse wave velocity in humans, (3) transducer development for blood pressure measuring device, and (4) cardiovascular monitoring system. It was found, in experiments on dogs, that the pulse wave velocity is linearly

related to diastolic blood pressure over a wide range of blood pressure and in the presence of many physiological perturbations. A similar relationship was observed in normal, young human males over a moderate range of pressures. Past methods for monitoring blood pressure and a new method based on pulse wave velocity determination were described. Two systems were tested: a Doppler ultrasonic transducer and a photoelectric plethysmograph. A cardiovascular monitoring system was described, including operating instructions. Author

N76-12698*# Trustees of Health and Hospitals of the City of Boston, Inc., Mass.

ENGINEERING STUDIES OF VECTORCARDIOGRAPHS IN BLOOD PRESSURE MEASURING SYSTEMS, APPENDIX 3

Final Report

R. G. Mark 20 Oct. 1975 210 p refs

(Contract NAS9-11609)

(NASA-CR-144558) Avail: NTIS HC $7.75 CSCL 06B

The following subjects were covered: (1) ASM80 manual, (2) signal preprocessing as an aid to on-line EKG analysis, and (3) high speed evaluation of magnetic tape recordings of electrocardiograms. A description of the ASM80 symbolic assembly program for the INTEL 8080 microprocessor and a user's manual were presented. The capability of three redundancy reduction algorithms to produce adequate representations of electrocardiographic data was examined. A hardware device was constructed which carried out zero order interpolation on a signal. Examination of the zero order interpolators reconstructed signal indicated that this representation was adequate for analysis of rhythm. A system to analyze magnetic tapes of electrocardiograms recorded over 24 hour intervals was designed. The recordings are sampled 200 times per second using a Nova computer and a special interface system. This system was tested on several recordings of clinical data, containing over 75 premature ventricular contractions, each one of which was flagged. Author

N76-12699*# Trustees of Health and Hospitals of the City of Boston, Inc., Mass.

ENGINEERING STUDIES OF VECTORCARDIOGRAPHS IN BLOOD PRESSURE MEASURING SYSTEMS, APPENDIX 1

Final Report

R. G. Mark 20 Oct. 1975 243 p refs

(Contract NAS9-11609)

(NASA-CR-144556) Avail: NTIS HC $8.00 CSCL 06B

A small, portable, relatively inexpensive computer system was developed for on-line use in clinical or laboratory situations. The system features an integrated hardware-software package that permits use of all peripherals, such as analog-to-digital converter, oscilloscope, plotter, digital bus, with an interpreter constructed around the BASIC programming language. The system is conceptually similar to the LINC system developed in 1962, but is more compact and powerful due to intervening advances in integrated circuit technology. A description of the hardware of the system was given. A reference manual, user manual, and programming guides were also presented. Finally, a stereo display system for vectorcardiograms was described. Author

N76-12700# Royal Aircraft Establishment, Farnborough (England).

BACKACHE IN HELICOPTER PILOTS. ANALYSIS, ETIOLOGY, TREATMENT AND PREVENTION

R. Sliosberg Sep. 1975 11 p Transl. into ENGLISH of conf. paper from the Intern. Aeron. and Cosmonautical Med. Congr. Presented at 9th Congr. in Europe, Madrid, 1962 p 145-151 (RAE-Lib-Trans-1857; BR49769) Avail: NTIS HC $3.50

Spinal complaints were investigated in 128 helicopter pilots, all of whom had at least 500 hours experience. Findings showed that 87.5 percent suffered from spinal pain when flying, the majority in the lumbar region. However the incidence of cervical and thoracic spinal pain was also high. Classically these complaints started after approximately 300 hours flying and were more likely to occur if the previous intensity of flying had been high. Once established the affected pilots suffered back pain on all but the shortest flights. It was established that the main aetiology of the condition was twofold; the posture adopted by the pilot to fly the helicopter and the relatively high vibration levels present in helicopters. It was concluded that incidence and seriousness of the problem can be reduced by a variety of measures described in this report. Author

N76-12701*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

SPECTRAL ANALYSIS OF SKELETAL MUSCLE CHANGES RESULTING FROM 59 DAYS OF WEIGHTLESSNESS IN SKYLAB 2

Earl V. LaFevers, A. E. Nicogossian, G. W. Hoffler, W. Hursta, and J. Baker Nov. 1975 24 p refs

(NASA-TM-X-58171; JSC-09996) Avail: NTIS HC $3.50 CSCL 06P

During stressful exercise of the m. gastrocnemius, preflight and postflight surface electromyograms (EMG) were taken from each of the Skylab II astronauts. Measurements on the muscle were made once 5 days before launch, and four times postflight on recovery day, 4 days after recovery, 16 days after recovery and 29 days after recovery. It was hypothesized that the disused gastrocnemius would exhibit dysfunction characteristics similar to those found in laboratory studies on disuse and of pathologically astrophied muscle, and that physical stress would be associated with heightened fatigability in the muscle. Both hypotheses were sustained. The results showed significant shifts of the predominant frequency of the gastrocnemius into higher than normal bands which suggests a relationship between muscle disuse characteristics and pathologic dysfunction characteristics. It was concluded that the spectrally analyzed EMG is a sensitive measure of muscle dsyfunction that is associated with disuse. Antigravity muscles exhibit heightened susceptibility to fatigue when subjected to lengthy weightlessness. Author

N76-12702*# Scientific Translation Service, Santa Barbara, Calif.

SCANNING ELECTRON MICROSCOPY OF THE LYMPHOCYTE TRANSFORMATION IN VITRO BY THE PHYTOHEMAGGLUTININ

J. Renau Piqueras, A. Martinez Ramon, and G. Forteza Bover Washington NASA Dec. 1975 25 p refs Transl. into ENGLISH from Sangre (Barcelona), v. 20, no. 2, 1975 p 134-149

(Contract NASw-2791)

(NASA-TT-F-16694) Avail: NTIS HC $3.50 CSCL 06P

Scanning electron microscopy was used to study the lymphocytes of normal human peripheric blood and the thymus, and cells which are transformed by the FHA. The lymphocytes of peripheric blood can be divided into two groups. The first, population B, is composed of cells with an abundance of microvilli. The second, population T, in composed of smooth cells. The lymphocytes of the thymus appear as cells lacking microvilli. Lymphocytes stimulated by FHA (lymphocytes T) show after 6 hours of cultivation the presence of numerous microvilli which last throughout the whole transformation, including the blasts aged 360 hours. Variations in cellular diameter, longitude and density of the microvilli during blastic transformation run parallel during the complete process, reaching the highest values at 48 hours. These findings are discussed in light of knowledge of the stimulation of lymphocytes by FHA, as well as the similarity of the aged blasts with some cases of acute lymphoblastic leukemia. Author

N76-12703# Joint Publications Research Service, Arlington, Va.

VESTNIK OF THE USSR ACADEMY OF MEDICAL SCIENCES, NO. 8, 1975

21 Oct. 1975 138 p refs Transl. into ENGLISH from Vestn. Akad. Med. Nauk SSSR (USSR), no. 8, 1975 p 3-94

(JPRS-65970) Avail: NTIS HC $6.00

Articles are presented on research in the medical fields. Topics discussed include emotional stress and cardiovascular disease, cerebral organization of human emotions, information neuroses and cardiovascular pathology, neurophysiological mechanism of arterial hypertension in experimental emotional stress, psychosomatic correlations in the presence of myocardial infarction, the limbic system of the brain, cortical and subcortical correlations in the formation of nociceptive stress, and emotional stress and sleep.

N76-12704 Joint Publications Research Service, Arlington, Va.
EMOTIONAL STRESS AND CARDIOVASCULAR DISEASE
Ye. I. Chazov *In its* Vestn. of the USSR Acad. of Med. Sci., no. 8, 1975 (JPRS-65970) 21 Oct. 1975 p 1-7 Transl. into ENGLISH from Vestn. Akad. Med. Nauk SSSR (USSR), no. 8, 1975 p 3-8

Stress is considered as a result of overextension of the regulatory mechanisms; this results in a distinctive disruption to which the organism responds by means of distorted hormonal and vascular reactions, and a change in metabolism. The role of emotional stress in the onset of cardiac ischemia and myocardial infarction was investigated. M.J.S.

N76-12705 Joint Publications Research Service, Arlington, Va.
CEREBRAL ORGANIZATION OF HUMAN EMOTIONS
N. P. Bekhtereva and V. M. Smirnov *In its* Vestn. of the USSR Acad. of Med. Sci., no. 8, 1975 (JPRS-65970) 21 Oct. 1975 p 8-21 refs Transl. into ENGLISH from Vestn. Akad. Med. Nauk SSSR (USSR), no. 8, 1975 p 8-19

In the course of treating patients by the method of implanted electrodes, some data were obtained concerning the structural and functional organization of human emotions. Phenomena in man's psychic life are discussed: prolonged and brief artificial psychic states (including emotional ones) which could be induced by electrostimulation of subcortical structures. The cerebral mechanisms of these artificial states are analyzed. It was shown that certain changes in slow electrical processes of the cortex and deep structures of the human brain are correlated with activation of attention, positive and negative emotional personality reactions, and certain emotional states. The data submitted corroborate the hypothesis that there are rigid and flexible elements in the corticosubcortical system of implementing psychic activity. The significance is discussed of the data with respect to selective therapeutic reorganization of the emotional sphere of a patient, on the basis of the conditioned reflex principle.
Author

N76-12706 Joint Publications Research Service, Arlington, Va.
INFORMATION NEUROSES AND CARDIOVASCULAR PATHOLOGY
M. M. Khananashvili *In its* Vestn. of the USSR Acad. of Med. Sci., no. 8, 1975 (JPRS-65970) 21 Oct. 1975 p 22-30 refs Transl. into ENGLISH from Vestn. Akad. Med. Nauk SSSR (USSR), no. 8, 1975 p 19-26

Information neurosis is described as a form of pathology which develops as a result of overloading the brain with highly significant information within too short a time. The distinctions of disturbances referable to cardiac activity in the presence of information neurosis were established, and the necessity of examining intersystemic interaction as a reliable index for early stages of neurosis is considered. Possibilities are described with respect to neurophysiological control of the level of emotional strain, with consideration of the role of brains limbic structures in regulating the time parameters of traces of pathological conditioned reflexes.
Author

N76-12707 Joint Publications Research Service, Arlington, Va.
PSYCHOPHARMACOLOGICAL ASPECTS OF EMOTIONAL STRESS
A. V. Valdman *In its* Vestn. of the USSR Acad. of Med. Sci., no. 8, 1975 (JPRS-65970) 21 Oct. 1975 p 31-43 refs Transl. into ENGLISH from Vestn. Akad. Med. Nauk SSSR (USSR), no. 8, 1975 p 26-33

A study was made of the effects of psychotropic agents on cardiovascular reactions associated with emotional tension induced in cats by electrostimulation of emotiogenic zones of the hypothalamus, or psychogenic stress (in chronic experiments). It was shown that the drugs studied do not depress cardiovascular reactions when used in tranquilizing doses due to activation of diencephalic protection zones. This indicates that the substrates of emotional stress are resistant to psychodepressants. With spontaneous (psychogenic) activation of mechanisms of emotional tension, the tranquilizing effect of psychotropic agents was associated with a decrease in tonic hypertensive reactions. There was no impairment of vegetative implementation of motor reactions; the tonic-hypertensive changes due to recurrent psychogenic stress were depressed by small doses of psychodepressants. Sedative doses of barbiturates restore self-regulation of arterial pressure. Katapressan, a hypotensive agent with central action, elicits a psychosedative effect and suppresses cardiovascular manifestations of the emotional stress reaction.
Author

N76-12708 Joint Publications Research Service, Arlington, Va.
NEUROCHEMICAL CHARACTERISTICS OF SPECIFIC PATHOLOGICAL SYNDROMES OCCURRING IN THE PRESENCE OF STRESS
I. P. Anokhina *In its* Vestn. of the USSR Acad. of Med. Sci., no. 8, 1975 (JPRS-65970) 21 Oct. 1975 p 44-55 Transl. into ENGLISH from Vestn. Akad. Med. Nauk SSSR (USSR), no. 8, 1975 p 34-43
Avail: NTIS

In experiments on rats, as well as studies of healthy individuals and patients with psychogenic neurosis and psychosis, it was shown that impaired adjustment under stress and development of various pathological syndromes (somatic and psychic) are largely related to typical changes in functions of adrenergic structures of the central nervous system. The onset of such changes is due to shifts in activity of catecholamine neuromediator systems of the brain (which develop in relation to both the force and duration of stress) individual distinctions of these neurochemical systems, their compensatory capabilities, and the activity of a number of enzymes involved in synthesis and breakdown. The purposeful use of psychopharmacological agents that have different effects on the functions of adrenergic structures of the brain helps improve adaptation of the organism to stress conditions, as well as to administer pathogenetic therapy when they occur.
Author

N76-12709 Joint Publications Research Service, Arlington, Va.
NEUROPHYSICAL MECHANISMS OF ARTERIAL HYPERTENSION IN EXPERIMENTAL EMOTIONAL STRESS
K. V. Sudakov *In its* Vestn. of the USSR Acad. of Med. Sci., no. 8, 1975 (JPRS-65970) 21 Oct. 1975 p 56-67 refs Transl. into ENGLISH from Vestn. Akad. Med. Nauk SSSR (USSR), no. 8, 1975 p 43-50

Experiments were conducted to determine whether it is possible to reproduce the natural history of essential hypertension from its transient to persistent stages in the case of artificially induced negative emotional stress; this is in the situation when the conditions are simulated under which stimulation of negative emotional centers has a continuous efferent pressor influence on vessels. Electrodes were implanted in the region of the ventromedial or paraventricular nuclei of the rabbit hypothalamus, and the threshold level of electrostimulation which elicited the anxiety and fear reaction was determined. Results of the investigation are discussed. M.J.S.

N76-12710 Joint Publications Research Service, Arlington, Va.
SOME PSYCHOSOMATIC CORRELATIONS IN THE PRESENCE OF MYOCARDIAL INFARCTION, AND QUESTIONS OF REHABILITATION
I. K. Shkhbatsabaya *In its* Vestn. of the USSR Acad. of Med. Sci., no. 8, 1975 (JPRS-65970) 21 Oct. 1975 p 68-75 Transl. into ENGLISH from Vestn. Acad. Med. Nauk SSSR (USSR), no. 8, 1975 p 56-75

Clinical observations revealed that in many cases myocardial infarction develops in direct connection with acute psychic trauma and prolonged chronic nervous stress. The pathological psychic changes are discussed which make it difficult to rehabilitate and return to work individuals who have suffered acute myocardial infarction. A classification system of both adequate psychological and pathological (neurotic) reactions to illness was developed and is discussed in detail. M.J.S.

N76-12711 Joint Publications Research Service, Arlington, Va.
THE LIMBIC SYSTEM OF THE BRAIN, EMOTIONAL STRESS AND ITS ENDOCRINE AND VEGETATIVE MANIFESTATIONS

F. P. Vedyayev *In its* Vestn. of the USSR Acad. of Med. Sci., no. 8, 1975 (JPRS-65970) 21 Oct. 1975 p 76-88 refs Transl. into ENGLISH from Vestn. Akad. Med. Nauk SSSR (USSR), no. 8, 1975 p 57-65

The neurodynamics and vegetative and hormonal correlations of emotional stress states of limbic origin were investigated. These emotional stress states are found to be associated with changes in physiochemical constants of blood, dynamics of the blood-clotting system, level of corticosteroid production, cardiovascular activity, and functional state of the digestive system. Systemic hemodynamic changes are associated with manifestation of the tension and stress syndrome and must be considered in close relationship to changes in other physiological systems.
M.J.S.

N76-12712 Joint Publications Research Service, Arlington, Va.
DYNAMICS OF CORTICAL AND SUBCORTICAL CORRELATIONS IN FORMATION OF NOCICEPTIVE STRESS
A. M. Mamedov and A. I. Shumilina *In its* Vestn. of the USSR Acad. of Med. Sci., no. 8, 1975 (JPRS-65970) 21 Oct. 1975 p 89-97 refs Transl. into ENGLISH from Vestn. Akad. Med. Nauk SSSR (USSR), no. 8, 1975 p 65-70

The emotional stress state model studied was developed as a result of repeated nociceptive electrodermal stimulation, which elicits a sharp increase in inspiratory tonus of the respiratory center, tremor of the stimulated extremity, and a generalized motor reaction in animals. The areas studied include distinctions of cortical and subcortical correlations at different stages of emotional stress organization, the influence regularity of stressor delivery on the development of emotional stress, and the correlation between signalling and reinforcing stimulation in the defensive functional system. The results of experiments conducted with rabbits are discussed.
M.J.S.

N76-12713 Joint Publications Research Service, Arlington, Va.
THE MECHANISM OF SELECTIVE LESIONS TO THE CARDIOVASCULAR SYSTEM IN PSYCHOEMOTIONAL STRESS
Yu. M. Repin and V. G. Startsev *In its* Vestn. of the USSR Acad. of Med. Sci., no. 8, 1975 (JPRS-65970) 21 Oct. 1975 p 98-106 refs Transl. into ENGLISH from Vestn. Akad. Med. Nauk SSSR (USSR), no. 8, 1975 p 71-76

Investigations were conducted in the following areas: etiopathogenesis of essential hypertension and cardiac ischemia, development of significant theoretical concepts of specific physiological mechanism of the pathogenic contradictions between the social and biological factors, and identification of the key mechanism of selective injury to somatovisceral systems in the presence of psychoemotional stress. It was found that in the experiments conducted, cardiac ischemia and hypertension appeared and developed in monkeys without prior atherosclerosis.
M.J.S.

N76-12714 Joint Publications Research Service, Arlington, Va.
EMOTIONAL STRESS AND SLEEP
L. P. Latash, V. S. Rotenberg, and A. M. Veyn *In its* Vestn. of the USSR Acad. of Med. Sci., no. 8, 1975 (JPRS-65970) 21 Oct. 1975 p 107-114 refs Transl. into ENGLISH from Vestn. Akad. Med. Nauk SSSR (USSR), no. 8, 1975 p 76-81

Neurophysiological and psychophysiological investigation of sleep results in the assumption that the functional purpose of cerebral activity during sleep is related, to some extent, to processes of psychological defense against experiences that are capable of leading to emotional stress. In light of this hypothesis, the changes in structure of sleep that develop with acute and chronic emotional stress are analyzed.
Author

N76-12715 Joint Publications Research Service, Arlington, Va.
GENERAL CHARACTERISTICS AND SIGNIFICANCE OF STRESS REACTIONS
P. D. Gorizontov *In its* Vestn. of the USSR Acad. of Med. Sci., no. 8, 1975 (JPRS-65970) 21 Oct. 1975 p 115-126 refs Transl. into ENGLISH from Vestn. Akad. Med. Nauk SSSR (USSR), no. 8, 1975 p 81-89

Stress is defined as a nonspecific protective and adaptive neurohormonal reaction of the organism in response to various extreme stimuli that present the threat of impairing homeostasis. In stress, many (if not all) of the systems of the organism are involved in the reaction to avoid or overcome deleterious factors. Various types of stress reactions are discussed.
Author

N76-12716 Joint Publications Research Service, Arlington, Va.
CLINICAL ASPECTS OF USING LABELED FIBRINOGEN
V. S. Savelyev *In its* Vestn. of the USSR Acad. of Med. Sci., no. 8, 1975 (JPRS-65970) 21 Oct. 1975 p 127-130 refs Transl. into ENGLISH from Vestn. Akad. Med. Nauk SSSR (USSR), no. 8, 1975 p 90-94

The radioactive tracer method was used to solve the following diagnostic problems: (1) the detection of asymptomatic venous thrombosis; (2) pinpointing the localization and extensiveness of thrombosis; (3) determining the degree of activity of the thrombotic process; (4) determining the direction of spread of thrombosis; and (5) differential diagnostics of thombosis and clinically similar diseases.
Author

N76-12717# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.
PULMONARY CHANGES INDUCED BY AMBIENT LEVELS OF OZONE, A MORPHOLOGICAL STUDY
L. W. Schwartz, W. S. Tyler, and D. L. Dungworth Dec. 1974 19 p refs Prepared in cooperation with Calif. Univ., Davis
(AF Proj. 6302)
(AD-A011873; AMRL-TR-74-125-Paper-24) Avail: NTIS CSCL 06/20

The objectives were to define the lesions of ambient levels of O3 (0.2, 0.5, and 0.8 ppm) after seven days of intermittent exposure using light microscopy, scanning electron microscopy (SEM), and transmission electron microscopy (TEM). SEM provided the advantages of observing large tissue samples and correlation of surface alterations with histologic and ultrastructural changes. This study was part of a larger one designed to correlate biochemical and morphological findings following O3 exposure and to compare the effects of continuous and intermittent daily exposure regimes. A portion of the biochemical results and the histochemical results have been published previously (Castleman et al., 1973a; Castleman et al., 1973b; Chow et al., 1974).
GRA

N76-12718# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.
THE EFFECTS OF 6-MONTH CHRONIC LOW LEVEL INHALATION EXPOSURES TO HYDRAZINE ON ANIMALS Final Report
J. D. MacEwen Dec. 1974 19 p refs Prepared in cooperation with California Univ., Irvine
(AF Proj. 6302)
(AD-A011865; AMRL-TR-74-125-Paper-16) Avail: NTIS CSCL 06/20

To compare the effects of repeated 6 hour per day, 5 day per week (industrial type) exposures with continuous exposures of equivalent concentrations and to evaluate the safety factor of the current threshold limit value (TLV), four concentration levels were selected for the 26-week exposure of four animal species. The concentrations selected were: 1.0 ppm and 0.2 ppm for continuous exposures and 5.0 ppm and 1.0 ppm for intermittent daily exposures. The effects of chronic inhalation of hydrazine are dose related regardless of the nature of exposure, i.e., intermittent or continuous. The highest hydrazine dose caused approximately 40% deaths in mice within the first two months of exposure while the TLV dose equivalents caused approximately 5% mortality.
GRA

N76-12719# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.
RECENT ADVANCED IN THE TOXICOLOGY OF N-NITROSO AND HYDRAZINE COMPOUNDS Final Report
Ronald C. Shank Dec. 1974 22 p refs Prepared in cooperation with California Univ., Irvine
(AF Proj. 6302)

(AD-A011864; AMRL-TR-74-125-Paper-15) Avail: NTIS CSCL 06/20

The toxicity and metabolism of N-nitroso compounds and hydrazines are discussed. Carcinogeneity is also treated. GRA

N76-12720# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.

TOXIC HAZARDS EVALUATION OF NEW AIR FORCE FIRE EXTINGUISHING AGENTS Final Report

Ethard W. VanStee, Alan M. Harris, Michael L. Horton, and Kenneth C. Back Dec. 1974 22 p refs

(AF Proj. 6302)

(AD-A011861; AMRL-TR-74-125-Paper-12) Avail: NTIS CSCL 06/20

Major technical areas discussed include ecosystem modeling, water pollution, water reuse, toxic hazards evaluation of fire extinguishants, environmental carcinogenesis, and cellular toxicology. GRA

N76-12721# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.

CHRONIC TOXICITY OF JP-4 JET FUEL Final Report

Edwin R. Kinkead, Louis C. DiPasquale, Edmond H. Vernot, and James D. MacEwen Dec. 1974 15 p refs Prepared in cooperation with California Univ., Irvine

(AF Proj. 6302)

(AD-A011860; AMRL-TR-74-125-Paper-11) Avail: NTIS CSCL 06/20

Accidental overexposure of workers to JP-4 vapors indicated the need for a Threshold Limit Value (TLV) for this jet fuel based on experimental data. A lack of animal toxicity information necessitated the design of a test to define the chronic toxic effects of low levels of JP-4 vapors on several species of laboratory animals. Toxicity data from this study could then be used either to predict safe exposure levels or provide input for the design of a subsequent test to determine an industrial TLV for JP-4. Application of this TLV would serve to prevent health hazards to those individuals charged with handling JP-4 jet fuel either in storage or in the field. Based on these data, it is suggested that workmen should not be allowed to inhale more than 2.5 mg/liter JP-4 vapors for extended periods of time, i.e., eight hours a day, 5 days per week. It must be emphasized that this standard recommendation is only an estimate based on the available experimental data and is subject to modification following a more detailed examination of the histopathological results. GRA

N76-12722# Indiana Univ., Bloomington. Dept. of Anatomy and Physiology.

PHYSIOLOGICAL ADJUSTMENTS TO ENVIRONMENTAL FACTORS Final Report, 1 Sep. 1973 - 31 Aug. 1974

Howard M. Rostorfer 31 Aug. 1974 200 p refs

(Grant AF-AFOSR-2383-72; AF Proj. 9777)

(AD-A012061; AFOSR-75-0171TR) Avail: NTIS CSCL 06/19

The following conclusions are considered warranted by the investigators: (1) there is an increase in the sensitivity of the thermoregulatory centers in the hypothalmus following heat acclimation; (2) there is no increase in the peripheral sensitivity of the reflex sweating mechanism with heat acclimation; (3) the human body undergoes significant physiological adaptation during heat acclimation; (4) the heat acclimation process is limited by the amount of work and heat stress imposed giving only partial adaptation to more severe conditions; and (5) there were training effects associated with the heat acclimation process. The interactive human performance model written at the Department of Human Physiology, University of California, Davis, and originally implemented on a Burroughs B6700 has been adapted to run interactively on the CDC 6600 at Indiana University. GRA

N76-12723# Armed Forces Radiobiology Research Inst., Bethesda, Md.

HIGH-SPEED ANGIOGRAPHY OF EXPERIMENTAL HEAD INJURY

S. A. Shatsky, D. E. Evans, F. E. Miller, and A. N. Martins Mar. 1975 17 p refs

(DNA Proj. NWED-QAXM)

(AD-A012640; AFRRI-SR75-6) Avail: NTIS CSCL 06/5

Cineangiograms were performed at 1000 frames per second in anesthetized rhesus monkeys during 4 m/sec impact head injuries. Impacts that did not fracture the skull resulted in rapid transient movements of intracranial arteries. Lateral blows distorted the ipsilateral middle cerebral artery and reversibly displaced the anterior cerebral artery across the midline. Occipital blows distorted the peripheral branches of the middle and posterior cerebral arteries, and produced marked stretching of extracranial vessels. These data indicate that much of the intracranial movements hypothesized as etiologic in brain injury occurs in the first milliseconds following trauma. This technique allows for quantification of these interior events to aid in the understanding of traumatic brain injury. GRA

N76-12724# Optical Sciences Group, San Rafael, Calif. Visual Sciences Div.

INFLUENCE OF SOCIALLY USED DRUGS ON VISION AND VISION PERFORMANCE Annual Report, 1 May 1973 - 30 Jun. 1974

Arthur Jampolski, Merton C. Flom, Anthony J. Adams, Reese T. Jones, and Brian Brown 31 Jul. 1974 41 p refs

(Contract DADA17-73-C-3106)

(AD-A012909; Rept-741) Avail: NTIS CSCL 06/15

The chief objective of the research was to use the experience and results obtained from the previous contract project to conduct a well-organized, broad-based, three-year investigative study of those sensory, motor, and physiological aspects of vision that may be influenced by socially-used drugs. Alcohol was chosen as the primary drug of inquiry with marijuana serving as the major reference drug, and with stimulants and depressants being additional reference drugs later in the study; polydrug effects would be investigated during the third year of the study. GRA

N76-12725# Naval Research Lab., Washington, D.C.

REPORT ON NRL MEASUREMENTS AS A PARTICIPANT IN THE INDI Final Report

F. H. Attix, R. B. Theus, S. G. Gorbics, and C. C. Rogers May 1975 28 p refs

(AD-A012339; NRL-MR-3051) Avail: NTIS CSCL 06/18

NRL was invited to participate in the International Neutron Dosimetry Intercomparison (INDI) which took place during 1973 at the Radiological Research Accelerator Facility of Brookhaven National Laboratory, under the sponsorship of the International Commission on Radiation Units and Measurements. The source was a D-T generator of 15.5-MeV neutrons. Measurements were made only along the extended axis of the neutron beam; at 30 cm in free space, and at depths of 5, 10, and 20 cm in a 30 cm cubic water phantom positioned with its input face 20 cm from the neutron source. A 1-cc tissue-equivalent (TE) ion chamber was used with TE gas or air flowing through it to measure the total n/gamma dose in tissue, with appropriate corrections. Thermoluminescent dosimeters were employed to measure the gamma-ray dose component, assuming that the n/gamma sensitivity ratio measured in the NRL neutron beam (approx. 15 MeV average energy) was appropriate to the free-space measurement for the INDI. The gamma-ray dose component at 30 cm from the target is negligible in free space, probably not exceeding a few tenths of a percent of the total dose there. Within the phantom it is necessary to make a correction to the (n/gamma) sensitivities of the TLD's to account for the degradation of neutron energy with depth. The neutron spectrum at 5 cm, 10 cm, and 20 cm depth has been estimated by Herling through Monte Carlo calculations. GRA

N76-12726 Illinois Univ., Urbana.

THE EFFECT OF LISTENER CONFIDENCE OF RECEPTION, AND HABITUATION-FACILITATION PHENOMENA ON BRAIN WAVE PATTERNS DURING A TEST OF AUDITORY DISCRIMINATION Ph.D. Thesis

Herbert Jay Gould 1975 155 p

Avail: Univ. Microfilms Order No. 75-24311

The relationship of consistent brain wave patterns to a listener's confidence of message reception was examined. In addition, an effort was made to determine if habituation or

facilitation occurred in portions of the brain wave pattern as the presentation of stimulus material progressed. The subjects task was to repeat the stimulus word and then judge how confident they were that they heard the stimulus word correctly. Several forms of analysis were performed on the subject's electro-encephalogram which was recorded during the experimental task. The results of the analysis indicated that portions of the brain wave pattern were facilitated over time, and that the pattern, when locked to the subject's response, appeared to be related to the confidence of message reception. This wave form occurred approximately 300 to 450 msec. after the subject's response. It was further noted that a wave similar to the Contingent Positive Variation occurred with varying amplitudes and slopes which were dependent on the confidence of correct message reception. Dissert. Abstr.

N76-12727*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

CONSPICUITY OF TARGET LIGHTS: THE INFLUENCE OF COLOR

Mary M. Connors Washington Nov. 1975 15 p refs

(NASA-TN-D-7960; A-5791) Avail: NTIS HC $3.50 CSCL 05E

The conspicuity (or attention-getting qualities) were investigated of foveally-equated, colored lights, when seen against a star background. Subjects who were periodically engaged in a distracting cockpit task were required to search a large visual field and report the appearance of a target light as quickly as possible. Targets were red, yellow, white, green, and blue, and appeared either as steady or as flashing lights. Results indicate that red targets were missed more frequently and responded to more slowly than lights of other hues. Yellow targets were acquired more slowly than white, green, or blue targets; responses to white targets were significantly slower than responses to green or blue targets. In general, flashing lights were superior to steady lights, but this was not found for all hues. For red, the 2 Hz flash was superior to all other flash rates and to the steady light, none of which differed significantly from each other. Over all hues, conspicuity was found to peak at 2-3 Hz. Response time was found to be fastest, generally, for targets appearing at between 3 and 8 from the center of the visual field. However, this pattern was not repeated for every hue. Conspicuity response times suggest a complex relationship between hue and position in the visual field that is explained only partially by retinal sensitivity. Author

N76-12728*# National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.

EXPERIMENTAL STUDIES FOR DETERMINING HUMAN DISCOMFORT RESPONSE TO VERTICAL SINUSOIDAL VIBRATION

Thomas K. Dempsey and Jack D. Leatherwood Washington Nov. 1975 57 p refs

(NASA-TN-D-8041; L-10264) Avail: NTIS HC $4.50 CSCL 05E

A study was conducted to investigate several problems related to methodology and design of experiments to obtain human comfort response to vertical sinusoidal vibration. Specifically, the studies were directed to the determination of (1) the adequacy of frequency averaging of vibration data to obtain discomfort predictors, (2) the effect of practice on subject ratings, (3) the effect of the demographic factors of age, sex, and weight, and (4) the relative importance of seat and floor vibrations in the determination of measurement and criteria specification location. Results indicate that accurate prediction of discomfort requires knowledge of both the acceleration level and frequency content of the vibration stimuli. More importantly, the prediction of discomfort was shown to be equally good based upon either floor accelerations or seat accelerations. Furthermore, it was demonstrated that the discomfort levels in different seats resulting from similar vibratory imputs were equal. Therefore, it was recommended that criteria specifications and acceleration measurements be made at the floor location. The results also indicated that practice did not systematically influence discomfort responses nor did the demographic factors of age, weight, and sex contribute to the discomfort response variation. Author

N76-12729# Human Engineering Labs., Aberdeen Proving Ground, Md.

SIMULTANEOUS PROCESSING OF BISENSORY INFORMATION Final Technical Memo.

Lynn C. Oatman May 1975 25 p refs

(AD-A012149; HEL-TM-9-75) Avail: NTIS CSCL 05/10

The research on the simultaneous presentation of auditory and visual information has been reviewed and the issues examined as to whether the human operator can perform better when the same information is transmitted simultaneously through both the auditory and visual channels than when a single auditory or visual channel is used. The implications of the research may be summarized by saying that the data generally support some propositions which have implications for the design of military displays employing simultaneous auditory-visual presentations. GRA

N76-12730# Federation of American Societies for Experimental Biology, Bethesda, Md. Life Sciences Research Office.

SELECTION OF INDIVIDUALS FOR SPECIFIC DUTIES ASSOCIATED WITH NIGHT VISION PROFICIENCY

C. Jelleff Carr, Kenneth D. Fisher, and John M. Talbot Feb. 1975 23 p refs

(Contract F44620-74-C-0077; ARPA Order 2808; AF Proj. 6813)

(AD-A012588; AFOSR-75-0952TR) Avail: NTIS CSCL 06/16

The human ability to see at night depends on the person's level of dark adaptation, his physiological state, as well as behavioral and environmental factors. There are major individual differences in night vision and the reasons for some differences are known; however, many are essentially unknown or unstudied. It is proposed that through the utilization of the refined techniques recently developed in the fields of vision, physiology, biochemistry and behavior, it may be possible to select individuals for specific duties requiring night vision proficiency. To meet this goal an in-depth study of the subject is required to fully develop the concepts and the opportunities for future research. GRA

N76-12731# Oregon Univ., Eugene. Dept. of Psychology.

CODING SYSTEMS AND THE COMPREHENSION OF INSTRUCTIONAL MATERIALS Semiannual Technical Report, 1 May - 31 Oct. 1974

Ray Hyman Oct. 1974 14 p refs

(Contract F44620-73-C-0056; ARPA Order 2448)

(AD-A012976; AFOSR-75-1059TR) Avail: NTIS HC $3.50 CSCL 05/9

The objective of the current study is to improve instruction, especially instruction of adults who come to the instructional situation with varying degrees of relevant background and information. The practical problem is how to interface the instructional materials and their presentation with the skills and knowledge that the learner brings with him to the task. The research program attempts to supply some of the basic research that will help to answer such practical questions. GRA

N76-12732# Illinois Univ., Urbana. Aviation Research Lab.

GROUND-REFERENCED VISUAL ORIENTATION IN FLIGHT CONTROL TASKS: JUDGEMENTS OF SIZE AND DISTANCE

Stanley N. Roscoe Apr. 1975 34 p refs

(Contract N00014-67-A-0305-0025; NR Proj. 196-133)

(AD-A012869; ARL-75-7/ONR-75-1) Avail: NTIS CSCL 05/10

Mounting interest and activity in the application of dynamic computer-generated imagery (CGI) analogous to a real-time contact view from an airplane call for renewed investigation of the essential visual cues for contact flight. CGI systems have application both as contact analog flight displays and as outside visual scenes for flight simulators. In either case, systematic errors in distance judgments are encountered with all optical and electronic imaging systems, thereby requiring compensation by magnifying their images. Results of an experimental investigation of biased distance judgments with a projection periscope account for, but do not explain, a portion of the systematic error. Explanation of the experimental findings requires the formulation and validation of a comprehensive theory of size-distance perception that will account for the host of

unexplained experimental facts associated with judgments of the size and distance of objects in the visual field, including various optical illusions and the projection of after images. GRA

N76-12733# Minnesota Univ., Minneapolis. Dept. of Psychology.
THE HIERARCHICAL ORDERING OF PREFERENCE FOR RELATIONS IN SOLVING VERBAL ANALOGY ITEMS
Eileen Q. Monson and Rene V. Dawis Feb. 1975 35 p
(Contract N00014-67-A-0113-0030; NR Proj. 150-352; RR0420401)
(AD-A012897; TR-8) Avail: NTIS CSCL 05/7

Verbal analogy items were constructed consisting of an ambiguous stimulus word pair and two unambiguous response word pairs as choice alternatives. (Two relations are educible from ambiguous word pairs, but only one relation from unambiguous word pairs.) Both response alternatives were correct. The items were presented to subjects in a counterbalanced design to discover if preferences exist between the two competing relations in each item. The data were analyzed to see if these preferences ordered themselves into a hierarchy. GRA

N76-12734# Johns Hopkins Univ., Baltimore, Md. Dept. of Psychology.
INTERACTION AMONG LETTERS IN A VISUAL DISPLAY
Grover C. Gilmore 15 Jun. 1975 57 p refs
(Contract N00014-67-A-0163-0012; NR Proj. 197-017)
(AD-A012435; TR-77) Avail: NTIS CSCL 05/10

In three experiments on visual perception, noise items of both high and low scaled similarity to the target items were used to test the distance vs similarity interaction predicted by Estes' interactive channels model. Based on the results, an alternative model is proposed which emphasizes decisional confusions rather than inhibitory feature interactions. GRA

N76-12735# Old Dominion Univ., Norfolk, Va. Performance Assessment Lab.
SUSTAINED PERFORMANCE AND RECOVERY DURING CONTINUOUS OPERATIONS Interim Technical Report
Ben B. Morgan, Jr., ed. and Glynn D. Coates, ed. Arlington, Va. Army Res. Inst. for Behavioral and Social Sci. Dec. 1974 48 p refs Presented at 82nd Ann. Meeting of Am. Psychol. Assoc., New Orleans, 30 Aug. - 3 Sep. 1974 and at 18th Ann. Meeting of Human Factors Soc., Huntsville, Ala., 15-17 Oct. 1974
(Contract DAHC19-74-G-0018; DA Proj. 2Q1-61102-B-74B)
(AD-A012908; ITR-74-2) Avail: NTIS CSCL 05/10

The two sections of the report represent the reproduction of papers presented at the 82nd annual meeting of the American Psychological Association, New Orleans, Louisiana, 30 August - 3 September 1974 and the 18th annual meeting of the Human Factors Society, Huntsville, Alabama, 15-17 October 1974. Both papers are based on studies of continuous work and recovery conducted at the Performance Research Laboratory, University of Louisville, Louisville, Kentucky. Results summarized herein suggest that performance decrements during 36 hr of continuous work and sleep loss will vary between 11 and 35% depending upon the time of day at which the continuous-work session begins. It is also suggested that appropriately scheduled military personnel will be able to maintain acceptable levels of performance during 36 hr of continuous field operations and that these personnel will require 6 to 8 hrs of sleep before they are ready to return to duty. GRA

N76-12736# GRD, Inc., Warminster, Pa.
TRAINING PLAN FOR THE PRELIMINARY TEST AND EVALUATION DETACHMENT FOR LAMPS MK 3 (LIGHT AIRBORNE MULTI-PURPOSE SYSTEM)
26 Oct. 1973 20 p refs
(Contract N62269-74-C-0004)
(AD-A012549) Avail: NTIS CSCL 05/9

The training plan is for the specific purpose of developing the skills required for the development effort and does not affect the required Navy Training Plan for new systems. To accomplish the objectives of the preliminary operational test and evaluation of the LAMPS MK III system, skilled personnel must be provided to operate the equipments and to maintain them at the organizational level. As this is an all new system, the required personnel are not available and therefore must be trained by the developing activity, Naval Air Development Center, Warminster, PA. As additional information becomes available the content of this plan will expand. GRA

N76-12737# Navy Personnel Research and Development Center, San Diego, Calif.
TRANSFER OF TRAINING FOLLOWING COMPUTER-BASED INSTRUCTION IN BASIC OSCILLOSCOPE PROCEDURES Technical Report, Sep. 1973 - Mar. 1975
Hervey W. Stern Jul. 1975 29 p refs
(AD-A012637; NPRDC-TR-76-1) Avail: NTIS CSCL 05/9

As test equipment training becomes more individualized, the student usually has greater opportunity to experiment with the equipment he will be using on the job. Yet, for a variety of reasons, he may have to train on outmoded equipment or have limited exposure to the equipment. Computer-aided individualized instruction can overcome some of these problems. This method of training exposes the student to a wide range of situations where state-of-the-art equipment can be readily simulated. A program was developed for oscilloscope training utilizing the PLATO IV instructional system. Students trained by this method were compared with those trained in a traditional laboratory setting using an individualized workbook having the same objectives as the PLATO lesson. A performance test administered immediately following training indicated that the two groups had similar levels of overall skill, but differed in some subskill levels. GRA

N76-12738# Navy Personnel Research and Development Center, San Diego, Calif.
AN EVALUATION OF COMPUTER-MANAGED INSTRUCTION IN NAVY TECHNICAL TRAINING
Stuart B. Carson, Linda L. Graham, Larry G. Harding, Kirk A. Johnson, and G. Douglas Mayo Jun. 1975 76 p refs
(AD-A012638; NPRDC-TR-75-38) Avail: NTIS CSCL 05/9

The purpose of this project was to develop and evaluate a Computer-managed Instruction (CMI) system that would be less expensive than Computer-assisted Instruction (CAI), would provide a frequency of interaction that falls somewhere between that provided by CAI and that normally provided by CMI, and would handle some of the clerical and administrative burdens that are normally imposed by student-paced instruction. More specifically, a system was developed that would make assignments, grade tests, provide feedback to the student, and provide some of the information needed for the effective control and management of a large-scale system of student-paced instruction. Both the instruction and testing took place off line. The system was evaluated in two short courses taught at the Naval Air Technical Training Center, Memphis. It was compared to (1) classroom instruction and (2) a system of student-paced instruction that was based on the training materials and tests developed for the CMI system, but which substituted 'manual' operations for certain of the operations provided by the computer in the CMI system. GRA

N76-12739# Rensselaer Polytechnic Inst., Troy, N.Y.
FACTORS IN INNOVATION, PRODUCTIVITY, AND NON-PRODUCTIVITY IN RESEARCH: A REVIEW AND PILOT STUDY Final Report
Joseph A. Steger 27 Feb. 1975 109 p refs Sponsored by NSF
(PB-242982/7; NSF/RDA-75-76) Avail: NTIS HC $5.50 CSCL 05J

The feasibility and possible utility of studying the background characteristics of innovative and non-innovative researchers and engineers is examined. An assessment of the research literature concerning the characteristics of innovators, identifying the major propositions dealing with the relationship of specific background or personal characteristics to innovative behavior is presented along with a summary and analysis of the findings from a pilot study of these propositions. GRA

N76-12740*# General Electric Co., Wilmington, Mass. Aircraft Equipment Div.
ELECTROCHEMICAL OXYGEN CONCENTRATOR AS AN OXYGEN COMPRESSOR
[1975] 136 p
(Contract NAS2-7676)
(NASA-CR-137689) Avail: NTIS HC $6.00 CSCL 06K

A solid polymer electrolyte (SPE) oxygen compressor is described which generates pressures of 3000 psi. The SPE is a cation exchange membrane with chemical compatibility, and has the capability of withstanding 5000 psi. Other features of the compressor described include: gasketless sealing, porus plate cell supports, and conductive cooling. Results are presented of a computer program which defines the power of the system as a function of density, temperature, pressure, membrane thickness, and water content. F.O.S.

N76-12741*# Scott Aviation Corp., Lancaster, N.Y.
COMPRESSED AIR DEMAND-TYPE FIREFIGHTER'S BREATHING SYSTEM, VOLUME 1 Final Report, Oct. 1972 - Sep. 1975
J. L. Sullivan 15 Oct. 1975 100 p
(Contract NAS9-13177)
(NASA-CR-144561; ER-1075-Vol-1) Avail: NTIS HC $5.00 CSCL 06K

The commercial availability of lightweight high pressure compressed air vessels has resulted in a lightweight firefighter's breathing apparatus. The improved apparatus, and details of its design and development are described. The apparatus includes a compact harness assembly, a backplate mounted pressure reducer assembly, a lightweight bubble-type facemask with a mask mounted demand breathing regulator. Incorporated in the breathing regulator is exhalation valve, a purge valve and a whistle-type low pressure warning that sounds only during inhalation. The pressure reducer assembly includes two pressure reducers, an automatic transfer valve and a signaling device for the low pressure warning. Twenty systems were fabricated, tested, refined through an alternating development and test sequence, and extensively examined in a field evaluation program. Photographs of the apparatus are included. Author

N76-12742*# Scott Aviation Corp., Lancaster, N.Y.
COMPRESSED AIR DEMAND-TYPE FIREFIGHTER'S BREATHING SYSTEM. VOLUME 2: APPENDICES Final Report
John L. Sullivan 15 Oct. 1975 399 p refs Revised
(Contract NAS9-13177)
(NASA-CR-144562; ER-1075-Vol-2-Rev-A) Avail: NTIS HC $10.75 CSCL 06K

For abstract, see N76-12741.

N76-12743# Royal Aircraft Establishment, Farnborough (England).
THE SEAT AS AN INTERCONNECTING ELEMENT BETWEEN THE MOTOR VEHICLE AND MAN
H. Hontschik and I. Schmid Sep. 1975 21 p refs Transl. into ENGLISH from Automobiltech. Z. (Stuttgart), v. 74, no. 4, 1972 p 155-161
(RAE-Lib-Trans-1811; BR49768) Avail: NTIS HC $3.50

The dynamic interaction between vibration induced at the car suspension due to road surface irregularities and the vibrations produced on the seat and the man was investigated. Methods of reducing vibration reaching the man by altering the seat vibration characteristics were considered. The increase in comfort from the seat due to its correct anthropometric design is also discussed. Tests were performed to measure the transfer of vibration across the human body, and a transfer function between road surface and head was deduced. Author

N76-12744# Naval Postgraduate School, Monterey, Calif.
A NEW METHOD OF INTERFACING PILOT TO AIRCRAFT M.S. Thesis
Kenneth Warren Morge Mar. 1975 50 p refs
(AD-A012453) Avail: NTIS CSCL 05/8

A new method of interfacing pilot to aircraft for control of pitch and roll using myoelectric signals from arm muscles is studied. Electrodes with piggyback amplifiers along with active filters and an active matrixing network are used to process the signals. Author (GRA)

N76-12745# Chrysler Corp., New Orleans, La. Space Div.
PHASE 2 REPORT OF SHIPBOARD SEWAGE TREATMENT SYSTEM DEVELOPMENT PROGRAM FOR US NAVY SHIPS SYSTEM COMMAND Final Report
R. W. Claunch and M. P. Werner 21 Feb. 1975 49 p refs
(Contract N00024-71-C-5330)
(AD-A012946; TR-RE-75-271) Avail: NTIS CSCL 13/2

The report covers the Phase II development of a 200 man capacity Aqua-Sans shipboard sewage treatment system. The object of this development was the design, fabrication and test of a shipboard prototype to prove the concepts, sizing criteria, materials, and components in a land based test. Evaluations of the system were to determine function reliability, safety, maintainability and user acceptance. GRA

N76-12746# Aeronautical Systems Div., Wright-Patterson AFB, Ohio. Bare Base Equipment SPO.
BARE BASE EQUIPMENT DESCRIPTION
Aug. 1973 94 p
(AD-A012242; ASD/SMB-437A-73-0076) Avail: NTIS CSCL 15/5

The basic mission of the Bare Base Equipment Program is to provide a means to meet the nation's global committments by enabling the USAF to establish tactical air superiority through rapid, effective deployment to any contingency area by means of relocatable, air transportable equipment and facilities. Thus, Bare Base 437A provides a cost effective system by lowering the long-term operational and/or repeated deployment costs through (1) eliminating permanent construction, (2) recovering deployed structures and facilities for redeployment, and (3) using existing air bases in the United States or overseas as the permanent homes of the tactical forces, thus reducing higher overseas operational costs. Author (GRA)

N76-12747# Honeywell, Inc., Minneapolis, Minn. Systems and Research Center.
RESEARCH ON THE APPLICATION OF SEMICONDUCTING FILMS FOR EYE PROTECTION FROM IR LASERS Final Technical Report, 1 Oct. 1973 - 30 Sep. 1974
Warren Timothy Boord and Henry Y. B. Mar Dec. 1974 109 p refs
(Contract F41609-74-C-0003)
(AD-A012704) Avail: NTIS CSCL 20/6

The objective of this study was to produce semiconductor films with values of E sub g and omega sub p(the plasma frequency) such that the films would have a luminous transmission of 75% and an optical density of at least three throughout the wavelength band 1.0 to 1000 micrometers. Development of such broad band IR filters involved (1) a study of the transmission characteristics of candidate semiconducting films of indium tin oxide deposited on glass and specified optical-quality plastic substrates, (2) examination of the problems of film-base material compatibility, if any incompatibility exists, (3) examination of techniques for increasing the near-infrared rejection of the film while maintaining high luminous transmission, and (4) construction and testing of semiconductor coated plastic and glass eye protective devices. GRA

N76-12748# School of Aerospace Medicine, Brooks AFB, Tex.
ROD-SHAPED FOOD FOR HIGH-ALTITUDE FEEDING Final Report, Oct. 1971 - Dec. 1974
Joseph C. Crigler and John E. Vanderveen May 1975 10 p refs
(AF Proj. 7930)
(AD-A012198; SAM-TR-75-10) Avail: NTIS CSCL 06/8

A rod-shaped food concept using 0.2-in.-diameter by 3-in rods was operationally tested to meet the demands of pilots wearing full-pressure suits for solid or chewy foods. Of 7 food items evaluated, 6 had very acceptable flavor. Single- and multicavity rod-type devices for inserting the food items through the face plate of the pressure suit were acceptable. The multicavity device was more acceptable to newer pilots in the program,

and the single-type device was more acceptable for experienced pilots. Author (GRA)

N76-12980 European Space Agency, Paris (France).
THE EFFECT OF MECHANICAL VIBRATIONS ON MAN

Siegfried Ruff *In its* Environment Pollution, Flight Safety, Human Reactions to Vibration, Reentry Vehicles, Interplanet. Trajectories and Composite Mater. (ESA-TT-176) Jul. 1975 p 38-48 refs Transl. into ENGLISH of "Vortraege des DFVLR-Kolloquiums am 8. Mai 1973 im Forschungszentrum Porz-Wahn", DFVLR, Porz, West Ger. Report DLR-Mitt-73-16, 1973 p 47-57

Tests concerning the effects of vibration on supine human beings, such as experienced during atmospheric reentry of manned space capsules, were conducted. The test equipment consisted of a low frequency electrohydraulic vibration table mounted on a large centrifuge. Vibrational effects on visual acuity and tendon reflexes are discussed. A section of the inguinal ligament, the fossa ovalis, was found to be an area particularly prone to vibration effects. ESA

N76-13724+ Cornell Univ., Ithaca, N.Y.
STUDIES OF THE SEMICONDUCTING AND PHOTOELECTRIC PROPERTIES OF CHLOROPHYLL-A AGGREGATES Ph.D. Thesis
Ching Wan Tang 1975 249 p
Avail: NTIS Avail: Univ. Microfilms Order No. 75-27866

A simple method of electrodeposition was devised for the preparation of a thin film chlorophyll-a (Chl-a) microcrystals on an electrode surface. Spectroscopic properties of the film indicated that it was uniform and consisted of randomly oriented microcrystals. A powder X-ray diffraction study revealed that the individual Chl-a microcrystal in the film had an ordered structure. The electrodeposited film exhibited semiconducting and strong photoelectric behavior. The quantum efficiency of charge generation was estimated to be greater than 0.03. The mode of charge transport and the consequent photocurrent signal were dependent on the configuration of the photoconductivity cell. In one case, the Chl-a coated electrode was in contact with a solution of Chl-a monomers. In another configuration, the cell consisted of a metal-Chl-a-metal sandwich structure. The photovoltaic power conversion of the metal-Chl-a-metal sandwich cells was among the highest ever reported for organic photovoltaic cells. Dissert. Abstr.

N76-13725*# National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
AUTOMATED SINGLE-SLIDE STAINING DEVICE Patent Application
Judd R. Wilkins and Stacey M. Mills, inventors (to NASA) Filed 29 Oct. 1975 18 p
(NASA-Case-LAR-11649-1; US-Patent-Appl-SN-626942) Avail: NTIS HC $3.50 CSCL 06M

A simple apparatus and method is disclosed for making individual single Gram stains on bacteria inoculated slides to assist in classifying bacteria in the laboratory as Gram-positive or Gram-negative. The apparatus involves positioning a single inoculated slide in a stationary position and thereafter automatically and sequentially flooding the slide with increments of a primary stain, a mordant, a decolorizer, a counterstain and a wash solution in a sequential manner. NASA

N76-13726*# Transemantics, Inc., Washington, D.C.
AERIAL SUPER-LOW-VOLUME SPRAYING FOR PLANT PROTECTION
E. S. Budrik, P. N. Romantsov, and V. V. Kurdyukov Washington NASA Dec. 1975 8 p Transl. into ENGLISH of "Sverkhmaloobyemnoye opryskivaniye v zashchita rasteniy" Moscow, Ministry of Civil Aviation of the USSR, 1974 p 1-3
(NASA-TT-F-16810) Avail: NTIS HC $3.50 CSCL 02C

Aerial superlow volume spraying is a new progressive approach to plant protection which makes it possible, within the shortest period of time, to apply pesticides over a greater area of plantings, forests or pasture grounds with a minimum expenditure of means and labor force. The AN-2 aircraft, using the method of superlow volume spraying, can handle 700 to 800 hectares in one hour. Author

N76-13727# Armed Forces Radiobiology Research Inst. Bethesda, Md.
CORRELATION OF ACTA SCANNER NUMBER WITH ELECTRON DENSITY
W. E. Kiker, T. W. Hinz, and R. S. Ledley May 1975 13 p refs
(DNA Proj. NWED-QAXM)
(AD-A013254; AFRRI-TN75-5) Avail: NTIS CSCL 06/5

The report demonstrates that the numbers generated by computerized axial-transverse tomography devices, which are proportional to X-ray attenuation coefficients, correlate with electron density in low-Z biological materials rather than with mass density. For high-Z materials, where the photoelectric cross section is appreciable, the correlation is with the density of high-Z atoms. GRA

N76-13728# Armed Forces Radiobiology Research Inst., Bethesda, Md.
BIOLOGICAL MEASUREMENTS IN RODENTS EXPOSED CONTINUOUSLY THROUGHOUT THEIR ADULT LIFE TO PULSED ELECTROMAGNETIC RADIATION
S. J. Baum, M. E. Ekstrom, W. D. Skidmore, D. E. Wyant, and J. L. Atkinson Apr. 1975 22 p refs
(DNA Proj. NWED-QAXMC903)
(AD-A013250; AFRRI-SR75-11) Avail: NTIS CSCL 06/18

Rodents were exposed continuously for 94 weeks of their adult life to a total of 2.5 x 10 to the 8th power pulses from the AFRRI electromagnetic pulse (EMP) simulator which provides five pulses per second with a peak electric field intensity of 447 kV/m, a 5-nsec rise time and 550-nsec 1/e fall time. The following biological parameters were measured: blood chemistry, blood and bone marrow cellular concentration, chromosomal aberrations, erythrocyte production, effects on fertility and reproductive capability and appearance of tumors and other late effects. At no time before and particularly as the rodents approached the end of their life-span did any of the biological measurements indicate an effect of the EMP radiation. While it is extremely difficult to prove the absence of any injury, it can be unequivocally stated that EMP exposure presented no biological hazard to the rodents of the present study. GRA

N76-13729# Armed Forces Radiobiology Research Inst., Bethesda, Md.
REMOTE MEASUREMENT OF FLUID VOLUME BY X-RAY FLUORESCENCE
G. L. Hermann and W. E. Kiker May 1975 12 p refs
(DNA Proj. NWED-QAXM)
(AD-A013057; AFRRI-TN75-4) Avail: NTIS CSCL 06/12

A technique utilizing X-ray fluorescence has been used to measure remotely the volume, and, thereby, hydrostatic pressure of a cesium nitrate solution in vitro. The excitation radiation source was (99m)Tc and the X-ray spectra were measured with a sodium iodide spectrometry system. This technique may be applicable to long-term in vivo measurements of intracranial pressure for conditions such as hydrocephalus. GRA

N76-13731 Michigan Univ., Ann Arbor.
THE USE OF ADAPTIVE MODELING FOR THE CLINICAL DETERMINATION AND EVALUATION OF CARDIOVASCULAR SYSTEM PARAMETERS Ph.D. Thesis
Richard Van Calfee 1975 126 p
Avail: Univ. Microfilms Order No. 75-29184

A procedure is developed whereby the modern analytical tools of adaptive modeling and estimation theory can be used in a clinical environment to quantitatively determine some of the physiological parameters of an individual patient's cardiovascular system. In particular, the work concentrates on determining how left ventricular and systemic arterial parameters vary as a function of the state-of-health of an individual patient. A model of the systemic arterial system is used to determine values for central and peripheral arterial compliance and to evaluate the significance of and interaction between those

compliances. The effect of arterial compliance on the left ventricular work load is investigated. Those parameters of the system which can be used in the clinical evaluation of pulsatile arterial flow, as measured during cardiac catheterization, are identified. Once identified, the parameters are used to gain an understanding of the mechanisms which can produce particular arterial flow profiles in both normal and diseased systems.
Dissert. Abstr.

N76-13732 Washington Univ., Seattle.
A CATHETER SYSTEM FOR MEASURING BLOOD VESSEL CROSS SECTIONAL AREA AND BLOOD PRESSURE Ph.D. Thesis
Leo Edward Lindbloom 1975 147 p
Avail: Univ. Microfilms Order No. 75-28384

The development and fabrication are described of a six transducer, 15 MHz-PSN catheter tip device with associated electronics employed with a polyvinyl chloride catheter. The transducers are mounted radially around the catheter tip and each is used to generate a vector locating the catheter tip in relation to a specific area on the blood vessel wall. By superimposing the six radial vectors, one can map the location of the blood vessel wall and calculate a cross sectional area. The in vitro accuracy with which the catheter tip device can determine the inside cross sectional area of various rubber tubes in distilled water showed a maximum 2% deviation of the mean ultrasonic area from the actual tube area. Good in vivo agreement is shown between descending aorta or pulmonary artery cross sectional areas as determined by X-ray radiographs and with the catheter tip device.
Dissert. Abstr.

N76-13733# Federal Aviation Administration, Oklahoma City, Okla. Office of Aviation Medicine.
ANTHROPOMETRY OF AIRLINE STEWARDESSES
Clyde C. Snow, Herbert M. Reynolds, and Mackie A. Allgood Mar. 1975 107 p refs
(AD-A012965/0; FAA-AM-75-2) Avail: NTIS HC $5.25 CSCL 05/5

Body measurements are presented of 423 stewardess trainees enrolled in the American Airlines Stewardess Training Academy in Fort Worth, Texas, between February and June 1971. It includes the means, standard deviations, coefficients of variation, percentiles, and related statistics of 72 standard anthropometric and functional measurements. The survey was initiated to provide adequate criteria for improving the emergency equipment availability and workspace design for stewardess.
Author

N76-13734*# Transemantics, Inc., Washington, D.C.
HYDROSTATIC PRESSURES WITHIN THE EYE
M. C. Colenbrander Washington NASA Dec. 1975 9 p ref Transl. into ENGLISH from Klin. Monatsbl. Augenheilk. (Stuttgart), v. 167, 1975 p 94-97
(Contract NASw-2792)
(NASA-TT-F-16697) Avail: NTIS HC $3.50 CSCL 06P

The membranes of the body demonstrate two closely related characteristics which affect one another, namely, elasticity and tension. Almost all of the membranes of the body are elastic and most of the time they are under tension. Both of these factors play an important role in examining hydrostatic pressures within the eye, and more specifically, the reason why fluorescein appears later in the retina than in the choroid.
Author

N76-13735*# National Aeronautics and Space Administration, Lyndon B. Johnson Space Center, Houston, Tex.
SNAP-IN COMPRESSIBLE BIOMEDICAL ELECTRODE Patent Application
James D. Frost, Jr. (Methodist Hospital) and Carl E. Hillman, Jr., inventors (to NASA) (Methodist Hospital) Filed 8 Dec. 1975 10 p
(Contract NAS9-12460)
(NASA-Case-MSC-14623-1; US-Patent-Appl-SN-637269) Avail: NTIS HC $3.50 CSCL 06B

A replaceable, prefilled electrode enclosed in a plastic seal and suitably adapted for attachment to a reusable, washable cap having snaps is described. The apparatus is particularly adapted for quick positioning of electrodes to obtain an EEG. The individual electrodes are formed of a sponge body which is filled with a conductive electrolyte gel during manufacture. The sponge body is adjacent to a base formed of a conductive plastic material. The base has at its center a male gripper snap. The cap locates the female snap to enable the electrode to be positioned. The electrode can be stored and used quickly by attaching to the female gripper snap. The snap is correctly positioned and located by mounting it in a stretchable cap. The cap is reusable with new electrodes for each use. The electrolyte gel serves as the contact electrode to achieve a good ohmic contact with the scalp.
NASA

N76-13736*# Research Triangle Inst., Research Triangle Park, N.C.
APPLICATIONS OF AEROSPACE TECHNOLOGY IN BIOLOGY AND MEDICINE Final Report, Sep. 1974 - Aug. 1975
Aug. 1975 92 p
(Contract NASw-2729)
(NASA-CR-144919) Avail: NTIS HC $5.00 CSCL 06E

Results of the medically related activities of the NASA Application Team Program at the Research Triangle Institute are reported. A survey of more than 300 major medical device manufacturers has been initiated for the purpose of determining their interest and opinions in regard to participating in the NASA Technology Utilization Program. Design and construction has been commissioned of a permanent exhibit of NASA Biomedical Application Team accomplishments for the aerospace building of the North Carolina Museum of Life and Science at Durham, North Carolina. The team has also initiated an expansion of its activities into the Northeastern United States.
Author

N76-13737# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Bad Godesberg (West Germany). Inst. fuer Flugmedizin.
EFFECTS OF TWO TRANSATLANTIC FLIGHTS IN RAPID SEQUENCE UPON THE 24-HOUR RHYTHM IN THE URINARY EXCRETION OF 17 HYDROXYCORTICOSTEROIDS AND CATECHOLAMINES
Joerg Schmidt-Amelung 13 May 1974 70 p refs In GERMAN; ENGLISH summary
(DLR-FB-74-36) Avail: NTIS HC $4.50; DFVLR, Porz, West Ger. DM 26.10

The effects were studied in eight male subjects. Flights were performed as outgoing and return flight between Frankfurt and Chicago with a time shift of 6 hrs and a stopover time of 26 hrs. The results showed distinct excretion patterns in all studied functions on day 1 and 2. The diurnal rhythm of the 17-hydroxycorticosteroids showed marked time shift effects on day 1 after return. These changes and their operational significance for the flying personnel are discussed.
Author (ESA)

N76-13738# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Bad Godesberg (West Germany). Inst. fuer Flugmedizin.
DESYNCHRONIZATION OF CIRCADIAN RHYTHM OF EXERCISE PULSE RATE FOLLOWING TRANSMERIDIAN FLIGHTS
Georg Westerdorf 30 May 1974 66 p refs In GERMAN; ENGLISH summary
(DLR-FB-74-39) Avail: NTIS HC $4.50; DVFLR, Porz, West Ger. DM 22

The responses of the diurnal cycle of pulse rate to transatlantic flights with a 6 hr time shift were studied in eight untrained students during submaximal exercise. For this purpose the subjects were tested on a bicycle ergometer in 3 hourly intervals on two separate days before the outgoing and on days 1, 3, 5 and 8 following the outgoing and the homegoing flight. The sojourn in the U.S. was 16 days. Results showed a significant desynchronization of the diurnal cycle of pulse rate after the transmeridian flights with an average readaptation time of five days. No distinct differences were observed with respect to the direction of flight.
Author (ESA)

N76-13739# Armed Forces Radiobiology Research Inst., Bethesda, Md.
INITIAL SLOPE INDEX OF TOTAL CEREBRAL BLOOD FLOW MEASURED BY HYDROGEN CLEARANCE: A PRAGMATIC EVALUATION
T. F. Doyle, A. N. Martins, and A. I. Kobrino Jun. 1975 16 p refs
(DNA Proj. NWED-QAXM)
(AD-A012864; AFRRI-TN75-6) Avail: NTIS CSCL 06/16

An initial slope index of total cerebral blood flow, measured by hydrogen clearance from torcular blood, shows high correlation with flows calculated by bicompartmental analysis. In 247 flow measurements done on 41 rhesus monkeys, a linear regression analysis between these two methods of calculating flow shows a correlation coefficient of 0.9280 with a standard error about y values of plus or minus 7.63. The initial slope index is not only faster to calculate but does not require that a steady state be maintained for 10 minutes. GRA

N76-13740# Cincinnati Univ., Ohio. Dept. of Dermatology and Laser Labs.
RESEARCH ON HUMAN SKIN LASER DAMAGE THRESHOLDS Final Report, Nov. 1971 - Jun. 1974
R. James Rockwell, Jr. and Leon Goldman Jun. 1974 161 p refs
(Contract F41609-72-C-0007; AF Proj. 6301)
(AD-A012703; DERM-LL-74-1003) Avail: NTIS CSCL 06/18

The report gives the results of a two-year study to determine the lowest radiant exposure levels at which the first observable reactions occur on human skin exposed to electromagnetic radiations emitted by normal mode and Q-switched ruby, Q-switched neodymium-glass, carbon dioxide, argon and neodymium-YAG laser devices. The principal goal of the study was to establish the 50 percent probability dose for such minimal reactions observed one-hour post-exposure. Such minimal radiant exposure levels are defined, for the purpose of this report, as the fifty percent probability dose for minimal reactions, and are designated as MRD50 (Minimal Reaction Dose, 50% probability). GRA

N76-13741# Freie Univ., Berlin (West Germany). Physiologisches Institut.
VOLUME CONDITIONED STIMULI AFFECTING SALT AND WATER EXCRETION Final Scientific Report, 1 Jul. 1971 - 30 Nov. 1974
O. H. Gauer, J. O. Arndt, M. Echt, L. Lange, and K. Kirsch 4 Jun. 1975 11 p refs
(Contract F44620-71-C-0117; AF Proj. 9777; AF Proj. 6813)
(AD-A012690; AFOSR-75-0930TR) Avail: NTIS CSCL 06/19

An effort was made to quantitatively analyze the mechanics of cardiac distension during whole body immersion which represents the stimulus for the volume conditioned reflex. Equipment was built which allowed immersion of the upright sitting subject together with the measuring devices. A second tank was constructed for the roengenometric determination of heart volume when changing from standing in air to standing in water up to the neck. The main results were that heart size increases by 180 ml (range 120-320 ml) and central venous pressure to 15 mmHg. This is followed by a reflex fall of arterial flow resistance and peripheral venous tone by about 30 percent. GRA

N76-13742# Minnesota Univ., Austin. Hormell Inst.
BIOCHEMICAL INDICES OF STRESS Final Report, 1 Jan. 1969 - 30 Jun. 1975
Howard M. Jenkin 10 Jul. 1975 10 p refs
(Contracts N00014-67-A-0113-0011; N00014-75-C-0232; NR Proj. 108-844)
(AD-A012490) Avail: NTIS CSCL 06/1

The study was undertaken to investigate biochemical changes in rats and humans subjected to hyperbaric exposure and decompression. Efforts were made to determine biochemical markers as indicators of hyperbaric stress that might be useful in understanding the effects of high pressure on rats and human physiology to hopefully aid in anticipating physiological changes and develop appropriate diagnostic tests. GRA

N76-13743# New Mexico Univ., Albuquerque. Bureau of Engineering Research.
COMPUTER OPTIMIZATION OF COCHLEAR DESIGN PARAMETERS Interim Report
Victor W. Bolie Feb. 1975 63 p refs
(Grant AF-AFOSR-2178-72; AF Proj. 9769)
(AD-A012988; EE-227(75)AFOSR-222-3; AFOSR-75-1034TR) Avail: NTIS CSCL 06/4

The purpose of the document is to report the results of a rather extensive study of the electrical analog of the human cochlea, conducted by use of digital simulation techniques. The report includes a description of the structure and the equations of the cochlear analog, numerous response curves, and a set of near-optimum parameter values. Some three-dimensional representations of the vibrations of the basilar membrane are also presented. GRA

N76-13744# North Carolina Univ., Chapel Hill. Dept. of Physiology.
TISSUE OXYGEN TENSION AND THE INTRACELLULAR OXIDATION-REDUCTION STATE Final Report, 1 Apr. 1970 - 30 Sep. 1973
A. T. Miller, Jr. Jun. 1975 22 p refs
(Contract F41609-70-C-0026; AF Proj. 7164)
(AD-A012735; SAM-TR-75-14) Avail: NTIS CSCL 06/19

Hypoxia from a variety of causes (such as trauma, shock, fire, and mechanical failure of pressurized aircraft) is a potential hazard to military personnel. The availability of noninvasive methods for evaluating the severity of both general and local hypoxia of tissues would be of great value. The objectives of this project were to: (1) examine the effects of hypoxia produced in various ways on the intracellular oxidation-reduction state (reflecting oxygen availability), and (2) use these results to validate relatively less invasive techniques (e.g., measuring the surface oxygen tension of organs). GRA

N76-13745# Optical Sciences Group, San Rafael, Calif. Visual Sciences Div.
OBJECTIVE TESTING OF MARIJUANA-INDUCED VISION CHANGES Final Report, 1 May 1972 - 30 Apr. 1973
Arthur Jampolsky, Merton C. Flom, Anthony J. Adams, and Reese T. Jones 30 Apr. 1973 62 p refs
(Contract DADA17-72-C-2083)
(AD-A012831; Rept-731) Avail: NTIS CSCL 06/15

Nine vision functions were measured by objective methods in a study sample of 19 experienced, male, marijuana users who smoked a 0.8 gram natural marijuana cigarette containing 1.5 percent (12 milligrams) of delta-9-tetrahydrocannabinol. Placebo cigarettes were smoked as a control. The experiments were carried out double-blind with a cross-over design. Six related functions were also measured. Some of the subjects were also given 22 mg THC, alcohol, or Librium in separate experiments. The chief results are: (a) a reduction in glare recovery time with marijuana, (b) a decrease in intraocular pressure with marijuana, alcohol or Librium, (c) a deterioration of tracking eye movements with alcohol, (d) a rapid rise in pulse rate at the start of smoking marijuana followed by a rapid fall within minutes after smoking. GRA

N76-13746# Saint Luke's Hospital, Milwaukee, Wis.
NITROGEN ELIMINATION IN MAN DURING DECOMPRESSION AND THE EFFECT OF AIR OR OXYGEN BREATHING ON HELIUM ELIMINATION DURING DECOMPRESSION FOLLOWING HELIUM DIVES Final Technical Report, 1 Nov. 1972 - 31 Oct. 1974
Eric P. Kindwall 27 May 1975 51 p refs
(Contract N00014-73-A-0139-0001; NR Proj. 201-013)
(AD-A012836) Avail: NTIS CSCL 06/19

Nitrogen elimination following air dives and helium elimination following helium dives were measured quantitatively during decompression to determine the effect of the decompression profile and/or gas mixture breathed to the inert gas elimination. A closed circuit system was found to be necessary to accumulate measurable amounts of inert gas eliminated from the body using the MS-8 Mass Spectrometer in respiratory mode. While breathing helium/oxygen following an air dive to 100 feet for

40 minutes, the maximal amount of nitrogen was eliminated at the 50 foot level during a 90 minute washout period following the air dive. Lesser amounts of nitrogen were eliminated at 10 feet following the same dive and the least amount was eliminated isobarically at 100 feet. Air and oxygen were found to be equally efficacious in measurements made over a 90 minute period in promoting helium elimination when breathed at a depth of 40 feet following a 120 foot, 40 minute helium/oxygen dive. Further work is continuing with the subjects totally submerged in water. GRA

N76-13747# Wayne State Univ., Detroit, Mich. Dept. of Mechanical Engineering Sciences.
AN EXPERIMENTALLY VALIDATED DYNAMIC MODEL OF THE SPINE
P. Prasad (Ford Motor Co., Dearborn, Mich.) and Albert I. King 31 Mar. 1975 17 p Presented at US Natl. Congr. of Appl. Mechanics, Colorado Univ., Boulder, 3-7 Jun. 1974 Submitted for publication Sponsored in part by Natl. Inst. of Gen. Med. Sci., Bethesda, Md.
(Contract N00014-69-A-0235-0001)
(AD-A012481; TR-4) Avail: NTIS CSCL 06/19

Although there has been a large number of mathematical models proposed for the simulation of spinal response to acceleration, few have been validated against experimental data and none appears to reflect the actual conditions of load transmission from one vertebra to the next. This paper provides a brief survey of existing spinal models and presents a discrete parameter model with experimental validation. The transmission of load via the articular facets is a major new feature of the model, based on previously obtained experimental data. Good correlation was obtained between the model results and experimentally measured spinal loads for different impact acceleration levels and spinal configurations. GRA

N76-13748# Howard Univ., Washington, D.C. Bio-Environmental Engineering and Sciences Research Lab.
BIOLOGICAL EFFECTS OF NON-IONIZING RADIATION
Man M. Varma and Eric A. Traboulay, Jr. Jul. 1975 56 p refs
(Contract N00014-73-A-0346-0002; NR Proj. 200-999)
(AD-A013315) Avail: NTIS CSCL 06/18

The goals of the research project were to complete a comprehensive and intensified research to categorize and evaluate the mutagenic injury caused by nonionizing radiation (microwaves). The variables in this study were microwave frequency, power density and time of exposure. Testicular tissue was examined histologically for evidence of damage, and mutagenicity and infertility was determined by the Dominant lethal Assay. Deoxyribonucleic acid isolation and characterization was undertaken. GRA

N76-13749# North Texas State Univ., Denton. Dept. of Chemistry.
BLOOD LIPID RESPONSES TO DECOMPRESSION SICKNESS Final Report
Scott J. North and George M. Adams 22 Apr. 1975 14 p refs
(Contract N00014-70-A-0222-0001; NR Proj. 101-791)
(AD-A013313; FR-1) Avail: NTIS CSCL 06/19

Studies were conducted to determine the role of circulating lipids in the etiology of decompression sickness and to evaluate liver and adipose tissues as possible sources of embolic lipid. It was found in vitro studies with rat liver slices that pressurization alone may be an inadequate stimulus for initiation of excessive liver lipid biosynthesis, and that an inadequate decompression may not result in a significant lipid loss from liver and adipose tissue. In vivo experiments were performed employing various agents known to affect various aspects of lipid metabolism. These agents were administered to rats which were subsequently exposed to a pressurization profile. The implications from this study were: (1) The levels of circulating lipids have little effect on decompression sickness. (2) Circulating free fatty acids have a profound effect on decompression sickness. (3) Ionic calcium concentrations are possibly involved in the etiology of decompression sickness. GRA

N76-13750# Texas Univ., Galveston. Medical Branch of Marine Biomedical Inst.
THE INFLUENCE OF INCREASED NITROGEN TENSIONS ON PROPERTIES OF IDENTIFIED NEURONS IN APLYSIA CALIFORNICA
1975 18 p refs Presented at 6th Proc. of Symp. on Underwater Physiol., San Diego, Calif., Jul. 1975
(Contract N00014-68-A-0105-0004)
(AD-A013272) Avail: NTIS CSCL 06/19

The results of experiments indicate that the passive electrophysiological properties and action potentials of neurons in the abdominal ganglion of Aplysia are unaffected by increases in nitrogen tensions to 10 atmospheres absolute. Since no significantly large or consistent alteration occurred in resting potential, action potential, membrane resistance or time constant, it is concluded that these membrane parameters and their underlying conductance states (for sodium and potassium) are not affected by nitrogen tensions through ten atmospheres. This would indicate that these conductance states are stable and well controlled in these neurons to this degree of pressure. The fact that Aplysia is considered an intertidal animal that has not been reported at depths greater than 200 feet indicates that the authors have only mildly stressed this animal's nervous system by taking it to depths equivalent to some 300 feet of sea water. GRA

N76-13751# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.
EFFECT OF RATE OF DOSING WITH ELEMENTAL MERCURY VAPOR ON BRAIN UPTAKE OF MERCURY Final Report
Richard Henderson Dec. 1974 6 p refs Prepared in cooperation with Olin Corp.
(AF Proj. 6302)
(AD-A011826; AMRL-TR-74-125-Paper-9) Avail: NTIS CSCL 06/10

Biological variations can account for some of the differences in dose-response that have been reported in the literature on occupational mercurialism. One of the errors in estimating dose has been in the use of calculated time weighted average exposures based on measurements of elemental mercury vapor in the general work environment. Some of the differences in mercury concentrations in the general work environment and in the micro-environment next to contaminated hands and clothing were reported by Henderson (1972). Another error in estimating dose of elemental mercury vapor has been the use of the work time only in calculating time weighted average exposure. If hands and clothing are contaminated with elemental mercury, this contamination can be a source of continuing exposure to elemental mercury vapor for the 16 hours off the job. Another possible source of error in the understanding of the effects of exposure to elemental mercury vapor may result from considering equivalent time weighted average exposures to be equivalent in effect without consideration of the rate of dosing. GRA

N76-13752# Naval Aerospace Medical Research Lab., Pensacola, Fla.
SOME CONSIDERATIONS CONCERNING THE USE OF MAGNETRON GENERATORS IN MICROWAVE BIOLOGICAL RESEARCH Interim Report
Vernon R. Reno 28 May 1975 14 p refs
(MF51524015)
(AD-A013329; NAMRL-1216) Avail: NTIS CSCL 06/18

A series of measurements was taken to characterize the microwave fields produced for biological studies by traveling-wave-tube and magnetron generators under different operating conditions. Results indicate that the field incident on the animal can differ depending upon both the generator and the conditions of its operation. These differences may not be apparent if the field is described only in terms of average power. GRA

N76-13753# Environmental Protection Agency, Washington, D.C. Office of Toxic Substances.
A FRAMEWORK FOR THE CONTROL OF TOXIC SUB-

STANCES (A COMPILATION OF SPEECHES)
Glenn E. Schweitzer Apr. 1975 57 p
(PB-243459/5; EPA-560/4-75-004) Avail: NTIS HC $4.50 CSCL 06T

This collection of speeches in large measure reflects the evolution of the interests, policies, and programs of the Office of Toxic Substances from April 1973 to March 1975. The speeches deal with questions that are of broad national concern: the identification of chemical hazards, the need for development of toxicological and other data on chemicals, the pending Toxic Substances Control Act, and need for regulation to control toxic chemicals. GRA

N76-13754# Bureau of Radiological Health, Rockville, Md.
PRECISE MICROWAVE POWER DENSITY CALIBRATION METHOD USING THE POWER EQUATION TECHNIQUES Final Report
W. A. Herman and H. Bassen Mar. 1975 39 p refs
(PB-242883/7; DHEW/FDA-75-8028) Avail: NTIS HC $4.00 CSCL 06R

A calibration method is described for providing an absolute plane-wave power density calibration of microwave hazard probes. Power equation techniques were used to provide highly precise measurements of mismatches to the various antennas from their respective sources or loads. The power equation techniques also provide the basis for precise determination of absolute power delivered to the calibrated antenna from an arbitary high-power source. Error analyses are presented for all aspects of the calibration system, including antenna gain, absolute power delivered to the antenna, and multipath errors. GRA

N76-13755# Physics International Co., San Leandro, Calif.
DEVELOPMENT OF A PIEZOELECTRIC DRIVER FOR A VENTRICULAR ASSIST DEVICE Annual Report, 1 Sep. 1973 - 31 Aug. 1974
Parker C. Smiley, C. G. ONeill, and Pius Chao Aug. 1974 90 p refs
(Contract HV-9-2253)
(PB-243436/3; PIFR-357-74) Avail: NTIS HC $5.00 CSCL 06B

Work performed on the development of an implantable piezoelectric (PZ) driver for a left ventricular assist device is reported for the period September 1, 1973 through August 31, 1974. Endurance testing on piezoelectric and hydraulic components is described. The driver provides hydraulic actuation to a left ventricular assist device, synchronized with the natural heart beat in counterpulsation. The components tested for endurance were the PZ pump, pressure-volume converter, and control valve. Life of the pump check valves exceeded 5000 hours, while life of the PZ elements exceeded 30,000 hours. Heat treatment of a beryllium-copper diaphragm is recommended to extend its life beyond 4500 hours. GRA

N76-13756# Physics International Co., San Leandro, Calif.
DEVELOPMENT OF A PIEZOELECTRIC DRIVER FOR A VENTRICULAR ASSIST DEVICE Annual Report, 1 Sep. 1972 - 31 Aug. 1973
Parker C. Smiley, C. G. ONeill, Chester R. Mueller, and Pius Chao Feb. 1975 114 p refs
(Contract HV-9-2253)
(PB-243435/5; PIFR-357-73; NIH/NHLI/NO1-HV-9-2253-4) Avail: NTIS HC $5.50 CSCL 06B

During the previous year's effort (1971 to 1972), Physics International Company developed a low frequency piezoelectric (PZ) driver for an artificial heart. The system, including the PZ driver and a TECO assist heart, delivered up to 11.4 liters per minute against 150/70 mmHg in vitro. In vivo, the device ran a synchronization with the natural heart of a calf over a wide range of pulse rates. The device was a bench model housed in a box 7 inches by 8-1/2 inches by 10 inches. The electronic components were in a case about 6 inches by 8 inches by 4 inches. During the last year (1972 to 1973), the authors integrated the bench model PZ-hydraulic subsystem into a compact implantable size--1-1/2 inches by 2-1/2 inches by 6 inches; and developed a new electronic subsystem of similar dimensions. GRA

N76-13757# Flying Personnel Research Committee, London (England).
THE EFFECT OF ADRENERGIC BETA-RECEPTOR BLOCKADE ON THE METABOLIC RESPONSE TO CENTRIFUGATION STRESS
M. H. Harrison Feb. 1975 20 p refs
(AD-A013426; FPRC-1336) Avail: NTIS CSCL 06/19

The metabolic effects of three short exposures to radial acceleration were examined following administration of either a beta-blocking drug (oxprenolol), or a placebo, in a group of 24 male subjects. Associated emotional stress was assessed using a line-marker technique, and from changes in heart rate. On placebo, centrifugation significantly increased non-esterified fatty acids (NEFA) and glycerol levels, but had little effect on blood glucose or lactate levels. Oxprenolol effectively abolished the increase in NEFA, but had no effect on glycerol levels. The drug abolished the emotionally-induced tachycardia observed during control period preceding centrifugation, but only partially abolished the tachycardia produced by centrifugation. It is concluded that increased noradrenaline secretion is responsible for the observed metabolic effects of centrifugation, and that the centrifugation-induced tachycardia is not a purely beta response. GRA

N76-13758*# McDonnell-Douglas Technical Services Co., Inc., Houston, Tex.
ADVANCED CREW PROCEDURES DEVELOPMENT TECHNIQUES Final Report
J. D. Arbet, R. L. Benbow, A. A. Mangiaracina, J. L. McGavern, M. C. Spangler, and I. C. Tatum 30 Oct. 1975 81 p refs
(Contract NAS9-14354)
(NASA-CR-144543; MDC-W0011) Avail: NTIS HC $5.00 CSCL 05E

The development of an operational computer program, the Procedures and Performance Program (PPP), is reported which provides a procedures recording and crew/vehicle performance monitoring capability. The PPP provides real time CRT displays and postrun hardcopy of procedures, difference procedures, performance, performance evaluation, and training script/training status data. During post-run, the program is designed to support evaluation through the reconstruction of displays to any point in time. A permanent record of the simulation exercise can be obtained via hardcopy output of the display data, and via magnetic tape transfer to the Generalized Documentation Processor (GDP). Reference procedures data may be transferred from the GDP to the PPP. Author

N76-13759# Federal Aviation Administration, Oklahoma City, Okla. Office of Aviation Medicine.
ATTITUDES ON EN ROUTE AIR TRAFFIC CONTROL TRAINING AND WORK: A COMPARISON OF RECRUITS INITIALLY TRAINED AT THE FAA ACADEMY AND RECRUITS INITIALLY TRAINED AT ASSIGNED CENTERS
John J. Mathews, Bart B. Cobb, and William E. Collins May 1975 38 p refs
(AD-A013343/9; FAA-AM-75-3) Avail: NTIS HC $3.75 CSCL 05/10

In this comparison, questionnaires concerning aspects of training related and work related attitudes were sent to 225 ATC trainees who represented groups of attritions and retentions in two training programs; viz., programs that provided basic training at the FAA Academy and programs that provided basic training at the trainees' assigned facilities. Data from both groups generally support our previous findings regarding sources of differences in work attitudes between sexes and between attrition/retention groups. The overall profile of work attitudes was a positive one for attritions and retentions of both sexes. With regard to training, Academy instructors and Academy training received very high ratings from all groups of subjects. The majority of subjects in both the Academy trained and the facility trained groups felt Academy training should precede facility training. Author

N76-13760*# Kanner (Leo) Associates, Redwood City, Calif.
PHYSIOLOGICAL AND PSYCHOLOGICAL FOUNDATIONS OF WORK

Ye. F. Polezhayev, N. P. Kalinina, V. G. Makushin, S. E. Slavina, and V. I. Dorogoychenko Washington NASA Dec. 1975 174 p refs Transl. into ENGLISH of the book "Fiziologicheskiye i Psikhologicheskiye Osnovy Truda" Moscow, Profizdat Press, 1974 p 1-232
(Contract NASw-2790)
(NASA-TT-F-16647) Avail: NTIS HC $6.75 CSCL 05E

The physiology and psychology of work, the concept of working conditions and scientific organization of work are defined. The structure and function of the nervous system and the role of excitation, inhibition and conditioned and unconditioned reflexes in regulation of physical and mental activity are discussed. The main tasks and methods of study of the psychophysiology of work, the psychophysiological and sanitary-hygienic principles relating to the technology-man-environment system, principles of organization of the workplace, occupational selection and professional training are discussed, and the nature of fatigue and measures to prevent it are analyzed. Recommendations are given on scientifically sound work and rest routines and on ways and methods of introduction of industrial esthetics are presented. A six-level classification of work according to difficulty is presented and discussed. Author

N76-13761# Illinois Univ., Urbana. Aviation Research Lab.
SYSTEM PERFORMANCE AND STUDENT EVALUATION IN A COMPLEX COMPUTER BASED PROCEDURAL TRAINING PROGRAM
Stanley R. Trollip Apr. 1975 52 p refs
(Contract F44620-70-C-0105; AF Proj. 6813; AF Proj. 9778)
(AD-A013067; ARL-75-4/AFOSR-75-1; AFOSR-75-1069TR) Avail: NTIS CSCL 05/9

The report deals with the problems of adapting a large-scale general computer aided instruction system (PLATO) for use in a very specific application. First the restrictions placed upon specific programs that use external input devices are discussed both in terms of the hardware and the software. Second, the effects of the use of such programs on system performance are discussed. However, because limited use of these programs is likely to be permitted for development purposes and for small numbers of people, their continued development is important. The educational implications of the successful use of the holding pattern program is discussed in light of economy of use and effectiveness of training. Mention is made of the radical approach used in the holding pattern program in terms of the 'learning by doing' philosophy. Finally, the role of this type of program in the development of correct mental representations of the task is discussed. GRA

N76-13762# Carnegie-Mellon Univ., Pittsburgh, Pa. Dept. of Computer Science.
ADAPTIVE PRODUCTION SYSTEMS
D. A. Waterman Dec. 1975 74 p refs
(Contract F44620-73-C-0074; Grant MH-07722; ARPA Order 2466)
(AD-A013570; CMU-CIP-Working-Paper-285; AFOSR-75-1081TR) Avail: NTIS CSCL 05/10

Adaptive production systems are defined and used to illustrate adaptive techniques in production system construction. A learning paradigm is described within the framework of adaptive production systems, and is applied to a simple rote learning task, a nonsense syllable association and discrimination task, and a serial pattern acquisition task. It is shown that with the appropriate production building mechanism, all three tasks can be solved using similar production system learning techniques. The adaptive production systems are quite parsimonious; that is, the learning program is represented in exactly the same fashion as the information being learned. Both are represented as production rules in a single production system. This eliminates the need for two types of control in the system; one for activating the learning mechanism and another for accessing the information learned. GRA

N76-13763# Carnegie-Mellon Univ., Pittsburgh, Pa. Dept. of Computer Science.
SERIAL PATTERN ACQUISITION: A PRODUCTION SYSTEM APPROACH
D. A. Waterman Feb. 1975 39 p refs
(Contract F44620-73-C-0074; Grant MH-07722; ARPA Order 2466)
(AD-A013569; CMU-CIP-Working-Paper-286; AFOSR-75-1082TR) Avail: NTIS CSCL 05/10

A production system technique for recognizing regularities in serial patterns is presented in the context of the letter series extrapolation problem. The learning technique consists of creating an ordered set of production rules to represent the concept of a pattern, such that each rule is a hypothesis about which pattern contexts lead to which new pattern elements. The production system learning technique is compared with other series extrapolation methods and examples of series concepts learned by a computer implementation of the technique are given. GRA

N76-13764# Honeywell, Inc., Minneapolis, Minn. Systems and Research Center.
THE FEASIBILITY OF GENERALIZED ACOUSTIC SENSOR OPERATOR TRAINING Final Report, Feb. 1974 - Feb. 1975
Richard W. Daniels and David G. Alden May 1975 82 p
(Contract N61339-74-C-0067)
(AD-A011846; NAVTRAEQUIPC-74-C-0067-1) Avail: NTIS CSCL 05/9

This program explored the feasibility of a generalized approach to acoustic sensor operator training and resulted in recommendations concerning implementation. The program involved the analysis of the task, skill, and knowledge requirements for acoustic sensor operators (ASO) across a representative sample of sensor systems. GRA

N76-13765# Haskins Labs., New Haven, Conn.
SPEECH RESEARCH Status Report, Jan. - Mar. 1975
Alvin M. Liberman Jun. 1975 237 p refs
(Contracts N00014-67-A-0129-0001; DAAB03-75-C-0419)
(AD-A013325; SR-41(1975)) Avail: NTIS CSCL 05/7

The report is one of a regular series on the status and progress of studies on the nature of speech, instrumentation for its investigation, and practical applications. Manuscripts cover the following topics: Preliminaries to a theory of action with reference to vision; two questions in dichotic listening; relationship of speech to language; rise time in nonlinguistic sounds and models of speech perception; phonetic coding of words in taxonomic classification task; on the front cavity resonance; synthetic speech comprehension; testing synthesis-by-rule with OVEBORD program; Stress and the elastic syllable; VOT or first-formant transition detector; pitch in perception of voicing states in Thai; facial muscle activity in production of Swedish vowels; combined cinefluorographic-EMG study of the tongue during production of /s/; velar movement and its motor command, the stuttering larynx. GRA

N76-13766# Yale Univ., New Haven, Conn. School of Organization and Management.
HIERARCHICAL LEVEL AND LEADERSHIP STYLE: ON THE RESOLUTION OF A CONTRADICTION
Arthur G. Jago and Victor H. Vroom Jul. 1975 49 p refs
(Contract N00014-67-A-0097-0027; NR Proj. 177-935)
(AD-A013353; TR-8) Avail: NTIS CSCL 05/10

Previous research regarding the effects of hierarchical level on leadership behavior has produced seemingly contradictory results. The methodologies employed in the present investigation were able to produce both patterns of results from data obtained in the same organization. Analysis of data collected from managers at four different hierarchical levels and within the same level show opposite relationships. Reasons for the incongruity and its implications for the organization are discussed. GRA

N76-13767# University of Southern Calif., Marina del Rey. Information Sciences Inst.
OBSERVATION METHODS FOR HUMAN DIALOGUE Technical Report, 1 Jan. - 30 Jun. 1975
William C. Mann, James A. Moore, James A. Lewin, and James H. Carlisle 30 Jun. 1975 92 p refs
(Contract N00014-75-C-0710; ARPA Order 2930)
(AD-A013242; ISI/RR-75-33) Avail: NTIS CSCL 17/2

This report describes progress on a new approach for improving man-machine communication. The goal of the work is to significantly expand and diversify the capabilities of the computer interfaces that people use. The approach is first to design computer processes that can assimilate particular aspects of dialogue between people, then to transfer these processes into man-machine communication. The approach requires that particular aspects of the human ability to communicate be selected and studied in detail. This report describes new methods of data collection developed to meet this need and tells how they will be used. The report focuses on nine phenomena of human dialogue which have been selected from approximately 23 phenomena proposed and explored. For most of the nine, explicit observational instructions are given as well. GRA

N76-13768# Naval Postgraduate School, Monterey, Calif.
THE EFFECTS OF SIMILARITY AND DISSIMILARITY ON GROUP PERFORMANCE M.S. Thesis
Kent William Wells Jun. 1975 80 p refs
(AD-A013468) Avail: NTIS CSCL 05/10

The thesis examines similarity and dissimilarity between leaders and members and the effects on group performance. Specifically, groups were formed according to individuals' least preferred coworker (LPC) scores. Groups comprised leaders and members with similar scores (high LPC leaders and members, low LPC leaders and members) or dissimilar scores (high LPC leaders and low LPC members, low LPC leaders and high LPC members). The groups then performed the NASA Moon Survival Exercise. The results are presented. GRA

N76-13769# Naval Postgraduate School, Monterey, Calif.
A COMPARISON OF PREDICTIONS OF GRADUATE STUDENT PERFORMANCE: IS IT ALL WORTH THE BOTHER?
John Senger and Richard Elster Jun. 1975 29 p refs
(AD-A013487; NPS-55SE75061) Avail: NTIS CSCL 05/9

A number of research efforts concerned with predicting the academic performances of graduate students are reviewed. The discussion is organized according to the types of predictors and criteria used. The results of many prediction studies are integrated using tabular presentations. Implications of the findings for making graduate student selection decisions are discussed. This is the second edition of such a review and includes additional studies using academic aptitude and personality measures in attempts to predict graduate school performances. GRA

N76-13770*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
EMERGENCY DESCENT DEVICE Patent Application
Robert R. Belew, inventor (to NASA) Filed 16 Oct. 1975 17 p
(NASA-Case-MFS-23074-1; US-Patent-Appl-SN-623188) Avail: NTIS HC $3.50 CSCL 06K

A descent device is provided for emergency descent from tall structures and for lowering objects from high elevations such as a hovering helicopter. The device includes a rotating spool having a cable wound thereon for descent and a rotation-retarding vane member which rotates in a fluid cylinder. An adjustable bypass is provided for the fluid as the vane member rotates therein so that the speed of descent can be adjustably controlled. NASA

N76-13771# California Univ., Los Angeles. School of Engineering and Applied Science.
BIOCYBERNETIC CONTROL IN MAN-MACHINE INTERACTION Final Technical Report, 1973 - 1974
Jacques J. Vidal, Marshall D. Buck, Ronald H. Olch, and Tulsi D. Ramchandani Dec. 1974 168 p refs
(Contract DAHC15-73-C-0303; ARPA Order 2434)
(AD-A012967; UCLA-ENG-7534) Avail: NTIS CSCL 06/4

The research program aims at incorporating EEG 'revoked responses' in man-machine communication. Present work is toward developing a methodology for the real-time computer discrimination of evoked responses in the EEG. Current experiments are visual evoked responses using colored and patterned visual stimuli. From the ensemble of these experiments, tentative candidate EEG codes have emerged that appear to reflect three retinal processes (red-green-blue). These are remarkable results since, while there is good evidence for a trichromatic absorbing structure in the fovea, there was no indication that these processes would be reflected into scalp potentials. Topological Dimensionality studies showed that red and green components, although close in timing, did behave in a clearly distinct manner. The response of the dark adapted eye, a limit case in background levels, was found clearly detached from the cluster in all cases. GRA

N76-13772# Walden Research Corp., Cambridge, Mass.
EVALUATION OF POTENTIAL SPACECRAFT WASH WATER PRETREATMENT SYSTEMS Research and Development Progress Report
D. C. Grant, A. Gollan, and R. L. Goldsmith Jun. 1975 102 p refs
(Contract DI-14-30-3275)
(PB-242984/3; W75-09050; Int-OSW-RDPR-75-1005) Avail: NTIS HC $5.50 CSCL 06K

Studies evaluated several treatment processes for use in the purification of the recycle wash waters generated aboard spacecrafts. The unit processes investigated included: regenerable filtration, ultrafiltration, regenerable sand depth filtration, regenerable glass fiber depth filtration, carbon adsorption, and reverse osmosis. The regenerable filtration studies have shown that ultrafiltration is far superior to the other filtration methods investigated from all aspects. Superiority was demonstrated in product water quality, system compactness, reliability, maintainability, and safety. GRA

N76-13773# National Bureau of Standards, Washington, D.C. Inst. for Materials Research.
BIOMATERIALS. PROCEEDINGS OF A SYMPOSIUM HELD IN CONJUNCTION WITH THE 9TH ANNUAL MEETING OF THE ASSOCIATION FOR THE ADVANCEMENT OF MEDICAL INSTRUMENTATION
Emanuel Horowitz and John L. Torgesen 11 Dec. 1975 109 p Symp. held at New Orleans, 19-20 Apr. 1974
(COM-75-10916/5; NBS-SP-415; LC-74-30305) Avail: NTIS HC $5.50; SOD HC also available as C13.10:415 CSCL 06L

A review of special topics in biomaterials research is presented that focuses attention on some noteworthy achievements. The topics covered include plasma polymerized polymers and their application in biomedicine; biocompatibility of ceramic materials and their application both as inert coatings for synthetic implants and as porous materials for bone repair; the selection of metallic implant materials through engineering and medical considerations; in vitro testing of thromboresistance; adsorption of blood proteins on synthetic substrates; a prosthesis for nerve regeneration; and properties of fibrous biomaterials. GRA

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